VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of a VPDES permit to Hanover County for the Doswell Water Treatment Plant. This permit is being processed as a Minor, Industrial permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260 et seq. The discharge (Outfall 001) consists of wastewater and the flow from miscellaneous drains from a conventional water treatment plant. This permit action proposes to establish effluent limitations and monitoring requirements on the discharge.

1. Facility Name and Address:

Doswell Water Treatment Plant
Hanover County Department of Public Utilities
7516 County Complex Road
Hanover, Virginia 23069-1530

Facility Location:

10076 Kings Dominion Boulevard
Doswell, Virginia

See **Attachment 1** – Ashland topographic map (#149C)

2. SIC Code: 4941 – Water Supply

3. Permit No. VA0025569

Expiration Date: November 18, 2009

4. Owner: Hanover County

Owner Contact: David F. Van Gelder
Chief of Operations and Maintenance
Hanover County Department of Public Utilities
Telephone Number: 804/365-6235
Facsimile Number: 804/365-6245
E-mail: dfvangelder@co.hanover.va.us

5. Application Complete Date: June 22, 2009

Permit Drafted By: Ray Jenkins, Piedmont Regional Office
Date: September 15, 2009

Reviewed By: Emilee Carpenter Date: September 17, 2009
Curt Linderman Date: September 18, 2009

6. Receiving Stream:

Name:	North Anna River
Basin:	York River
Subbasin:	NA
Section:	3
Class:	III
Special Standards:	None

River Mile 8-NAR006.02

The statistical low flows are as follows:

1-Day, 30-Year Low Flow:	23 MGD
1-Day, 10-Year Low Flow:	23 MGD
7-Day, 10-Year Low Flow:	25 MGD
30-Day, 10-Year Low Flow:	27 MGD
30-Day, 5-Year Low Flow:	28 MGD
Harmonic Mean Flow:	72 MGD

Tidal: No
On 303(d) List: No

See **Attachment 2** – Flow Frequency Determination / 303(d) Status memorandum

7. Operator License Requirements: A licensed wastewater operator is not required.

8 Reliability Class: Not applicable

9. Permit Characterization: (Check as many as appropriate)

( ) Issuance
(X) Reissuance
( ) Revoke & Reissue
( ) Owner Modification
( ) Board Modification
( ) Change of Ownership/Name
Effective Date:
( ) Municipal
SIC Code(s):
(X) Industrial
SIC Code(s): 4941
( ) POTW
( ) PVOTW
( ) Private
( ) Federal
( ) State
(X) Publicly-Owned Industrial

(X) Existing Discharge
( ) Proposed Discharge
(X) Effluent Limited
(X) Water Quality Limited
( ) WET Limit
( ) Interim Limits in Permit
( ) Interim Limits in Other Document (attached)
( ) Compliance Schedule Required
( ) Site Specific WQ Criteria
( ) Variance to WQ Standards
( ) Water Effects Ratio
( ) Discharge to 303(d) Listed Segment
( ) Toxics Management Program Required
( ) Toxics Reduction Evaluation
( ) Pretreatment Program Required
( ) Storm Water Management Plan
( ) Possible Interstate Effect

10. Wastewater Flow and Treatment

Outfall Number	Wastewater Sources	Treatment	Flow
001	Backwash of gravity filters, cleaning of flocculators and sedimentation basins, miscellaneous plant drains.	Settling Lagoon (2 cells; each with a capacity of 1.2 million gallons). Oil / Water separator on drain from diesel storage tank containment	387,500 gallons daily maximum

See **Attachment 3** – Flow Diagram

11. Sludge Disposal: Solids in the settling lagoon are pumped to an approximately 1.7 acre field (an old, shallow borrow pit) adjacent to the North Anna River for drying. After drying, the sludge is removed using heavy equipment and transported to landfill for disposal. A copy of the approved sludge disposal program is included as **Attachment 4**.

12. Material Storage: The facility uses liquid sodium hypochlorite, liquid alum, dry sodium fluoride, aqueous ammonia, dry alum, and soda ash, all of which are stored within the filter building which is fully enclosed. Two 55-gallon drums of sodium permanganate for use as needed are stored at the river water pump station. Diesel fuel for the backup generator is stored in a 5000 gallon above ground tank with a concrete berm. The bermed area has a drain valve that is normally in the closed position. The drain flows to an oil / water separator prior to discharge into the settling lagoon.

13. Ambient Water Quality Information: Ambient (or background) stream data (see Attachment 2) were obtained from a monitoring station on the North Anna River at the Route 30 bridge, approximately 0.6 mile downstream of the outfall. The following ambient data are used in the MSTRANTI spreadsheet in Attachment 7:

Mean hardness	19 mg/L
90th percentile stream temperature	25.9 ^{0}C
90th percentile stream pH	7.4 SU
10th percentile stream pH	6.4 SU

During the 2008 305(b) / 303(d) Water Quality Assessment, the section of the North Anna River to which this facility discharges was assessed as fully supporting all of its designated uses (Category 1).

This facility is not currently addressed in any approved TMDL.

14. Antidegradation Review and Comments:

The State Water Control Board's Water Quality Standards include an antidegradation policy (9 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect those uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The receiving stream was determined to be a Tier 2 waterbody because it is fully supporting of all designated uses.

15. Site Inspection: March 10, 2009 by Mike Dare.
See **Attachment 5**.

16. Effluent Screening:

The following data were reported in the permit application.

Pollutant	Analytical Result	Number of Samples
BOD_5 (mg/L)	< 2	1
COD (mg/L)	31	1
TOC (mg/L)	3.24	1
TSS (mg/L) [1]	5.7 daily maximum 2.4 long term average	28
Ammonia (mg/L)	0.26	1
Temperature (°C) [2]	14 daily maximum, winter 29 daily maximum, summer	8 6
pH (Standard Units) [3]	6.5 to 7.3	28
Total Residual Chlorine (mg/L)	0.0	1
Color (PCU)	2	1
Fluoride (mg/L)	0.34	1
Sulfate (mg/L)	16.4	1
Dissolved aluminum (µg/L)	64	1
Dissolved cadmium (µg/L)	<1	1
Dissolved chromium (µg/L)	<10	1
Dissolved copper (µg/L)	<5	1
Dissolved lead (µg/L)	<5	1
Dissolved mercury (µg/L)	<0.2	1
Dissolved zinc (µg/L)	<20	1

Pollutant	Analytical Result	Number of Samples
Hardness (mg/L)	25	1

(1) Also see **Attachment 6** for a summary of Discharge Monitoring Report (DMR) data. (Attachment 6 also includes an evaluation of monitoring frequencies.)

(2) River intake water temperatures which are considered representative of the settling lagoon discharge given the detention time of the lagoon. The average of the winter temperatures was 11.6 ^{0}C and the average of the summer temperatures was 27.8 ^{0}C.

(3) Also see Attachment 6.

Effluent analyses for all applicable water quality standard parameters are presented in **Attachment 7**. Attachment 7 includes an analysis of effluent and receiving stream mixing (MIX.exe), the MSTRANTI spreadsheet which calculates allowable wasteload allocations based on effluent and receiving stream characteristic data, and reasonable potential analyses (STATS.exe printouts) for appropriate parameters. Ammonia and Total Residual Chlorine (TRC) must be evaluated to determine if water quality based limitations are needed.

All of the quantification levels (QLs) reported above for the metals are less than the QLs established by the MSTRANTI spreadsheet. The QLs established by the spreadsheet are the concentrations above which effluent limitations would be required. As the reported QLs are less than the QLs in MSTRANTI, no further evaluation is required in regard to aquatic toxicity and limitations are not needed.

Dissolved zinc has a human health wasteload allocation of 510,000 µg/L. The reported zinc QL is well below that concentration. There are no applicable human health standards for dissolved cadmium, dissolved chromium, dissolved copper, and dissolved lead. For comparison however, the reported QLs are less than the Public Water Supply wasteload allocations that would be applicable if the receiving stream were designated a public water supply.

There are no applicable water quality standards for sulfate. The reported concentration of 16.4 mg/L is well below the wasteload allocation of 1,800 mg/L that would be applicable if the receiving stream were designated a public water supply.

There are no water quality standards for BOD_5, COD, TOC, TSS, color, fluoride, and aluminum.

The receiving stream and effluent characteristic data used in the MSTRANTI spreadsheet are as follows:

1. Stream data are taken from Attachment 2. Also see item 13 above.

2. The effluent and receiving stream mixing percentages are from "Mixing Zone Predictions for Doswell Water Treatment Plant" in Attachment 7.

3. Effluent temperature and hardness data are from the permit application. The maximum reported effluent temperature is used as a reasonable approximation of the 90th percentile effluent temperature. Effluent pH percentiles are from Attachment 6. Effluent flow is the 30-day maximum value (also the daily maximum value) reported in the application and in Attachment 6.

17. Effluent Limitation Development:

Parameter	Limitation	Basis for Limitation
Flow	Monitoring only	NA
pH	6.0 to 9.0 Standard Units	Water Quality Standards
Total Suspended Solids	30 mg/L monthly average 60 mg/L daily maximum	Best Engineering Judgement*
Total Residual Chlorine	260 µg/L monthly average and daily maximum	Water Quality based limitations – see Attachment 7

* Standard DEQ limitations for discharges from water treatment plants.

18. Antibacksliding: All effluent limitations are as stringent as the limitations in the current permit (the permit reissued in 2004).

19. Special Conditions:

a. Special Condition B.1. – Operation & Maintenance (O&M) Manual

This special condition requires that the permittee maintain an accurate O&M Manual. The Code of Virginia §62.1-44.16, the VPDES Permit Regulation at 9 VAC 25-31-190 E, and 40 CFR 122.41(e) require proper operation and maintenance of the permitted facility. Compliance with an approved O&M Manual ensures compliance with those requirements.

The first paragraph of this special condition has been revised to be consistent with current guidance. Note that within 90 days of the effective date of the permit being reissued the permittee must submit notification that the O&M Manual is still accurate and complete. If the Manual is no longer accurate and complete, a revised Manual must be submitted within 90 days of the effective date of the permit being reissued. Other minor wording changes have also been made.

Special Condition B.1 in the 2004 permit also addresses the O&M Manual.

b. Special Condition B.2 – Materials Handling/Storage

9 VAC 25-31-50 A prohibits the discharge of any wastes into State waters unless authorized by permit. Code of Virginia §§62.1-44.16 and 62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste.

This special condition is the same as in the 2004 permit.

c. Special Condition B.3 – Notification Levels

This special condition is required by VPDES Permit Regulation, 9 VAC 25-31-200 A for all manufacturing, commercial, mining, and silvicultural dischargers.

This special condition is the same as in the 2004 permit.

d. Special Condition B.4. – Compliance Reporting

VPDES Permit Regulation 9 VAC 25-31-190 J.4 and 220.I authorize this special condition. This special condition establishes quantification levels for certain parameters and establishes protocols for calculation of reported values. This condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion.

Special Condition B.4 in the 2004 permit also addresses compliance reporting. The language in the proposed permit has been revised to reflect current format and content.

e. Special Condition B.5 – Closure of Wastewater Treatment Facilities

This special condition establishes the requirement to submit a closure plan for wastewater treatment facilities if the facilities are being replaced or closed (reference State Water Control Board Statutes §62.1-44.19).

This is a new special condition in the proposed permit (the 2009 permit).

f. Special Condition B.6 – TMDL Permit Reopener

This special condition addresses reopening of the permit, if necessary, to bring it into compliance with any applicable Total Maximum Daily Load (TMDL) approved for the receiving stream. The re-opener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Clean Water Act. During the 2008 305(b) / 303(d) Water Quality Assessment, the section of the North Anna River to which this facility discharges was assessed as fully supporting all of its designated uses (Category 1). This facility is not currently addressed in any approved TMDL. This reopener is included however, in all VPDES permits.

This is a new special condition in the 2009 permit.

g. Special Condition B.7 – Ground Water Monitoring

State Water Control Law §62.1-44.21 authorizes the Board to request information needed to determine the facility's impact on State waters. Ground water monitoring for parameters of concern will indicate whether possible seepage from the settling lagoon and sludge drying area is resulting in violations to the State Water Control Board's Ground Water Standards.

This is a new special condition in the 2009 permit.

The proposed permit requires a ground water monitoring program for the first time around the settling lagoon. This is consistent with guidance and with the permits for other water treatment plants.

Previous permits (1994 to 2003) required ground water monitoring at a single well downgradient of the sludge drying area. **Attachment 8** presents the data from that well. This monitoring was removed from the 2004 permit because contaminant concentrations did not increase over the monitoring period. The proposed permit requires the resumption of a ground water monitoring program around this area. Such monitoring is necessary as long as sludge is handled in this manner. Given the 2004 data analysis, the resumption of monitoring is appropriate as the data do not indicate the need for any corrective action at this time.

h. Special Condition B.8 – Reduced Monitoring Sampling Frequencies

Rationale: Permittees are granted a reduction in monitoring frequency based on a history of permit compliance. To remain eligible for the reduction, the permittee should not have violations during the permit term related to the effluent limitations for which reduced frequencies were granted. If permittees fail to maintain the previous level of performance, the baseline monitoring frequencies should be reinstated for those parameters that were previously granted a monitoring frequency reduction.

This is a new special condition in the 2009 permit.

i. Part I.C in the 2004 permit required quarterly Whole Effluent Toxicity (WET) testing for one year to determine if the discharge demonstrated actual or potential toxicity. If toxicity was not demonstrated, then testing could stop. Effluent toxicity was not demonstrated and the permittee was advised that no further testing was needed – see **Attachment 9**.

20. Part II, Conditions Applicable to All VPDES Permits

The VPDES Permit Regulation at 9 VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

21. NPDES Permit Rating Work Sheet: Total Score – 50. See **Attachment 10**.

22. Variances/Alternate Limits or Conditions:

Reduced Monitoring Frequencies: Effluent monitoring frequencies were evaluated in accordance with Guidance Memorandum 98-2005 and in accordance with EPA's "Interim Guidance for Performance-Based Reduction of NPDES Permit Monitoring Frequencies" (EPA 833-B-96-001). The facility has consistently been in compliance with the terms and limitations of the permit and has not been the subject of any enforcement action during the past three years. See Attachment 6 for an analysis of the effluent data. This evaluation indicates that the monitoring frequency for total suspended solids may decrease from once per month to once per six months.

23. Changes to Permit: See **Table 1**.

24. Public Notice Information required by 9 VAC 25-31-280 B:

Comment period: Start Date: October 16, 2009 End Date: November 16, 2009

Publication Dates: October 16 and 23, 2009 in the *Richmond Times-Dispatch*

All pertinent information is on file and may be inspected or copied by contacting Ray Jenkins at:

Virginia Department of Environmental Quality (DEQ)
Piedmont Regional Office
4949-A Cox Road
Glen Allen, Virginia 23060-6296

Telephone Number: 804/527-5037
Facsimile Number: 804/527-5106
Email: ray.jenkins@deq.virginia.gov

DEQ accepts comments and requests for public hearing by e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. DEQ may hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit.

The public may review the draft permit and application at the DEQ Piedmont Regional Office by appointment.

25. Additional Comments:

a. Previous Board Action: None

b. This facility is not subject to the General VPDES Watershed Permit Regulation for TN and TP Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia because it is not a significant discharger of nutrients and is not a new or expanding facility. The facility is not a significant discharger of nutrients because the discharge is less than 500,000 gallons per day (non-tidal stream) and does not discharge a nutrient loading equivalent to a 500,000 gallon per day municipal facility.

c. Per agreement between the Virginia Department of Game and Inland Fisheries (VDGIF), the Virginia Department of Conservation and Recreation (VDCR), and DEQ, this facility was evaluated for potential impacts to threatened and endangered species as part of the reissuance process. Review of the VDGIF and DCR databases indicated that no threatened or endangered species have been confirmed within the project area, except for the bald eagle which is not included in the agency's coordination agreement regarding aquatic species. It is not necessary therefore, to address threatened and endangered species in the permit.

d. Public Comment: Hanover County commented on the implementation schedule for establishing a ground water monitoring program. The 180 days provided in the draft permit to implement the approved ground water monitoring plan was negotiated to 270 days in response to the County's comment.

26. Summary of attachments to this Fact Sheet:

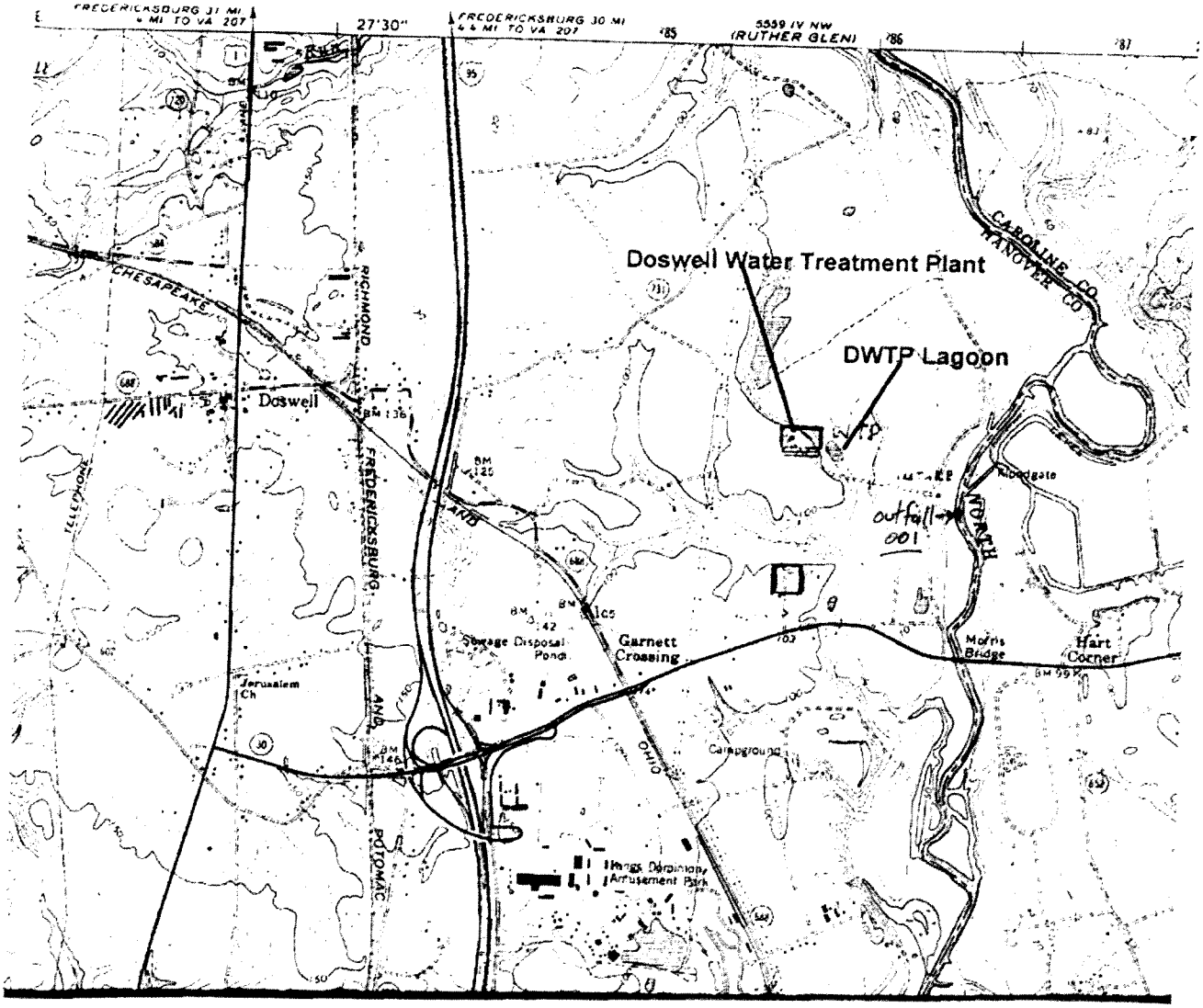
Attachment 1	Location Map
Attachment 2	Flow Frequency Determination / 303(d) Status memorandum
Attachment 3	Settling Lagoon Discharge Water Balance and Flow Diagram
Attachment 4	Settling Lagoon Sludge Removal Plan
Attachment 5	Facility Inspection Report (March 10, 2009)
Attachment 6	Effluent Data from Discharge Monitoring Reports (including monitoring frequency analysis)
Attachment 7	Evaluation of Water Quality-Based Effluent Limitations (MIX, MSTRANTI, and STATS printouts)
Attachment 8	2004 Ground Water Monitoring Evaluation
Attachment 9	DEQ Correspondence Regarding Whole Effluent Toxicity Testing
Attachment 10	NPDES Permit Rating Work Sheet

Table 1 – Permit Processing Change Sheet

PERMIT REFERENCE	PARAMETER CHANGED	MONITORING REQUIREMENT CHANGED		EFFLUENT LIMITS CHANGED		RATIONALE
		FROM	TO	FROM	TO	
Cover page	New format					New guidance
	Deleted "Department of Public Utilities" from owner name.					Application indicates Hanover County as owner
Part I.A.1	Added descriptive language in I.A.1 preamble					Clarity
	Total Suspended Solids	1 / Month	1 / 6 Months	No Change	No Change	Analysis of performance in relation to baseline monitoring frequencies results in proposed frequency – see Attachment 6
	Total Residual Chlorine	Not previously addressed	1 / Month	N / A	260 µg/L monthly average and daily maximum	Water quality-based limitation required because of potential of discharge to contain chlorine. See Attachment 7
	Revised wording of the items in the legend for clarity and added footnotes (a), (b), and (c). The definition of "5G / 8HC" was moved from the legend to footnote (c).					Footnote (a) implements DEQ guidance (GM 06-2016) that limitations be expressed using two significant figures. Footnotes (b) and (c) help define the monitoring requirements.
Part I.B – Special Conditions: See item 19 of the fact sheet for changes to the special conditions.						
Part I.C in the 2004 permit was deleted; see item 19.i of the fact sheet.						
REVISION BASED ON OWNER COMMENT: The 180 days provided to implement the approved ground water monitoring plan was negotiated to 270 days in response to the County's comments about having adequate budget to meet the originally proposed schedule.						

Attachment 1

Location Map


Doswell Water Treatment Plant
DWTP Lagoon
outfall 001
Doswell
Garnett Crossing
Sewage Disposal Pond
Campground
Morris Bridge
Hart Corner
Jerusalem Ch
CHESAPEAKE
RICHMOND
FREDERICKSBURG
POTOMAC
CAROLINE CO
HANOVER CO
NORTH
OHIO
TELEPHONE

Attachment 2

Flow Frequency Determination / 303(d) Status memorandum

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office
4949-A Cox Road Glen Allen, Virginia 23060

SUBJECT: Flow Frequency Determination / 303(d) Status
Doswell WTP – VA0025569

TO: Ray Jenkins

FROM: Jennifer Palmore, P.G.

DATE: June 4, 2009

COPIES: File

A flow frequency request was received for the North Anna River at the discharge of the Doswell water treatment plant. The outfall is located at rivermile 8-NAR006.02. Stream flow frequencies are required at this site for use by the permit writer in developing effluent limitations for the VPDES permit.

The flow on the North Anna River has been regulated by the Lake Anna dam since 1972. The stream gauge on the North Anna River at Hart Corner near Doswell, VA (#01671020) is located downstream of Lake Anna and approximately 0.5 mile downstream of both the Doswell WTP intake and discharge. Due to the proximity of the outfall and the gage, the flow frequencies can be considered equal.

North Anna River at Hart Corner near Doswell, VA (#01671020)
Drainage Area: 463 mi^2
Statistical Period: 1979-2003
High Flow Months: January to May

1Q30 = 35 cfs (23 MGD)	High Flow 1Q10 = 49 cfs (32 MGD)
1Q10 = 36 cfs (23 MGD)	High Flow 7Q10 = 52 cfs (34 MGD)
7Q10 = 39 cfs (25 MGD)	High Flow 30Q10 = 75 cfs (48 MGD)
30Q10 = 42 cfs (27 MGD)	HM = 111 cfs (72 MGD)
30Q5 = 44 cfs (28 cfs)	

During the 2008 305(b)/303(d) Water Quality Assessment, the section of the North Anna River to which Doswell discharges was assessed as fully supporting all of its designated uses (Category 1). It should therefore be considered a Tier 2 water.

A data analysis from station 8-NAR005.42 is attached. The station is located at the Route 30 bridge, approximately 0.5 mile downstream of the outfall.

The facility is not currently addressed in any EPA-approved TMDL.

If you have any questions, please let me know.

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler
8-NAR005.42	8/18/1972	S	0.3	22.22	7		8
8-NAR005.42	9/1/1972	S	0.3	23.33	6.3		9
8-NAR005.42	10/17/1972	S	0.3	14.44	6.6		8.2
8-NAR005.42	10/31/1972	S	0.3	12.22	6.4		9.4
8-NAR005.42	12/11/1972	S	0.3	8.89	6.7		11
8-NAR005.42	1/10/1973	S	0.3	5.56	6.7		14
8-NAR005.42	2/1/1973	S	0.3	3.89	6.7		12.59
8-NAR005.42	3/2/1973	S	0.3	6.67	7.1		13
8-NAR005.42	4/17/1973	S	0.3	15	7.2		9.6
8-NAR005.42	5/28/1973	S	0.3	18.89	7		8.8
8-NAR005.42	6/19/1973	S	0.3	22.22	6.3		7.8
8-NAR005.42	7/30/1973	S	0.3	27.22	7.2		7
8-NAR005.42	8/19/1973	S	0.3	24.44	6.9		8.4
8-NAR005.42	9/17/1973	S	0.3	23.33	6.9		10
8-NAR005.42	10/12/1973	S	0.3	20	8.2		8.2
8-NAR005.42	11/14/1973	S	0.3	12.22	7.1		10.79
8-NAR005.42	12/3/1973	S	0.3	5.56	6.8		10.59
8-NAR005.42	1/17/1974	S	0.3	5.56	6.8		11.79
8-NAR005.42	2/20/1974	S	0.3	5.56	7		11.79
8-NAR005.42	3/4/1974	S	0.3	10	7.4		13.19
8-NAR005.42	4/16/1974	S	0.3	12.22	6.8		8.4
8-NAR005.42	5/13/1974	S	0.3	16.67	7		9.2
8-NAR005.42	6/12/1974	S	0.3	24.44	7		7.4
8-NAR005.42	7/15/1974	S	0.3	27.22	6.9		7.2
8-NAR005.42	8/11/1974	S	0.3	23.33	7		7.8
8-NAR005.42	9/20/1974	S	0.3	16.67	7		11.39
8-NAR005.42	10/8/1974	S	0.3	13.89	7.5		8.3
8-NAR005.42	12/13/1974	S	0.3	8.33	6.5		12.19
8-NAR005.42	1/6/1975	S	0.3	4.44	6.8		12.59
8-NAR005.42	2/10/1975	S	0.3	4.44	7		13.79
8-NAR005.42	3/20/1975	S	0.3	6.67	7.1		11
8-NAR005.42	4/2/1975	S	0.3	14.44	7.5		10.89
8-NAR005.42	5/6/1975	S	0.3	16.67	7		9.6
8-NAR005.42	6/5/1975	S	0.3	23.33	7		7.8
8-NAR005.42	7/15/1975	S	0.3	25.56	6.5		6.8
8-NAR005.42	7/30/1975	S	0.3	25.56	7		7.6
8-NAR005.42	8/28/1975	S	0.3	28.33	7		7.8
8-NAR005.42	9/9/1975	S	0.3	24.44	7		7.6
8-NAR005.42	10/17/1975	S	0.3	18.33	7.5		8.8
8-NAR005.42	11/13/1975	S	0.3	15.56	6.9		9.2
8-NAR005.42	12/1/1975	S	0.3	11.11	7		10.5
8-NAR005.42	5/10/1976	S	0.3	17.78	7.6		9
8-NAR005.42	6/2/1976	S	0.3	15	7		8
8-NAR005.42	7/6/1976	S	0.3		7.5		8.5
8-NAR005.42	8/18/1976	S	0.3		7.5		7.6
8-NAR005.42	10/11/1976	S	0.3	18.33	7.4		9.4
8-NAR005.42	2/28/1977	S	0.3	10	7		11.79
8-NAR005.42	4/6/1977	S	0.3	12	7.5		10
8-NAR005.42	5/12/1977	S	0.3	19	7.5		8.7
8-NAR005.42	6/8/1977	S	0.3	20	7.8		8.6
8-NAR005.42	8/17/1977	S	0.3	2.9	7		6.9
8-NAR005.42	11/15/1977	S	0.3	10	7.2		10.59

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler
8-NAR005.42	12/14/1977	S	0.3	0.9	7.4		12.39
8-NAR005.42	1/10/1978	S	0.3	8	7		12.19
8-NAR005.42	3/6/1978	S	0.3	6	7.3		12.19
8-NAR005.42	4/13/1978	S	0.3	16	**9.5**		9.8
8-NAR005.42	5/10/1978	S	0.3	15	7.3		10.69
8-NAR005.42	6/6/1978	S	0.3	22	7.5		8.3
8-NAR005.42	7/26/1978	S	0.3	29	7		7.3
8-NAR005.42	8/7/1978	S	0.3	28	7		7.1
8-NAR005.42	11/20/1978	S	0.3	10.5	7		10.8
8-NAR005.42	12/13/1978	S	0.3	6	7.2		12.2
8-NAR005.42	1/8/1979	S	0.3	6.5	7.3		11.3
8-NAR005.42	3/22/1979	S	0.3	12	7		10.5
8-NAR005.42	4/24/1979	S	0.3	15	7.5		9.8
8-NAR005.42	6/14/1979	S	0.3	21	7		7.2
8-NAR005.42	8/8/1979	S	0.3	28	6.8		6.4
8-NAR005.42	9/20/1979	S	0.3	18	7		8.4
8-NAR005.42	10/16/1979	S	0.3	13.5	7		10
8-NAR005.42	11/14/1979	S	0.3	9.5	7		10.5
8-NAR005.42	12/11/1979	S	0.3	6.5	7		11.6
8-NAR005.42	1/29/1980	S	0.3	4	7.1		11.8
8-NAR005.42	2/27/1980	S	0.3	5	6.8		12.4
8-NAR005.42	3/17/1980	S	0.3	8.5	6.7		11.2
8-NAR005.42	4/15/1980	S	0.3	14	7.4		9.3
8-NAR005.42	5/12/1980	S	0.3	18	7.5		9
8-NAR005.42	6/16/1980	S	0.3	25	7.1		7.8
8-NAR005.42	7/10/1980	S	0.3	27	6.8		6.8
8-NAR005.42	8/4/1980	S	0.3	29	7.2		7.1
8-NAR005.42	9/8/1980	S	0.3	25	6.9		7.2
8-NAR005.42	10/14/1980	S	0.3	14	7.3		10.4
8-NAR005.42	11/24/1980	S	0.3	5.5	6.9		11.4
8-NAR005.42	12/16/1980	S	0.3	4	6.5		12.2
8-NAR005.42	1/20/1981	S	0.3	0.5	6.5		11.6
8-NAR005.42	2/17/1981	S	0.3	5.5	7		12
8-NAR005.42	3/18/1981	S	0.3	5	6.8		11.5
8-NAR005.42	4/16/1981	S	0.3	13	7.5		11
8-NAR005.42	5/12/1981	S	0.3	17	7		8.4
8-NAR005.42	6/15/1981	S	0.3	28.5	7.4		8.1
8-NAR005.42	7/14/1981	S	0.3	28	7		7
8-NAR005.42	8/12/1981	S	0.3	24.7	7		6.4
8-NAR005.42	9/10/1981	S	0.3	21.5	7		7.9
8-NAR005.42	11/19/1981	S	0.3	9	7		5
8-NAR005.42	12/8/1981	S	0.3	6	6.5		12.2
8-NAR005.42	2/9/1982	S	0.3	6	6.7		9.4
8-NAR005.42	3/24/1982	S	0.3	10	6.7		9.2
8-NAR005.42	4/28/1982	S	0.3	15	6.8		
8-NAR005.42	6/29/1982	S	0.3	27	6.8		5.9
8-NAR005.42	7/28/1982	S	0.3	28.5	7		5.8
8-NAR005.42	8/18/1982	S	0.3	24.5	6.8		6.2
8-NAR005.42	10/19/1982	S	0.3	13	6.7		9.8
8-NAR005.42	11/17/1982	S	0.3		6.7		11.4
8-NAR005.42	12/16/1982	S	0.3	8	6.5		10.8
8-NAR005.42	1/27/1983	S	0.3	3.5	6.7		12.1

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler
8-NAR005.42	2/10/1983	S	0.3	4	6.5		12.7
8-NAR005.42	3/15/1983	S	0.3	12	6.7		10
8-NAR005.42	4/19/1983	S	0.3	11	6.5		11
8-NAR005.42	5/19/1983	S	0.3	17	6.8		9.5
8-NAR005.42	6/21/1983	S	0.3	24.5	6.8		7.4
8-NAR005.42	7/12/1983	S	0.3	26	7		7.2
8-NAR005.42	11/15/1983	S	0.3	7	6.5		11.3
8-NAR005.42	12/8/1983	S	0.3	8	6		12
8-NAR005.42	2/7/1984	S	0.3	3	**5.9**		13.5
8-NAR005.42	3/5/1984	S	0.3	8	**5.5**		12
8-NAR005.42	4/26/1984	S	0.3	9	**5.9**		9.9
8-NAR005.42	6/4/1984	S	0.3	21.5	6.6		7.7
8-NAR005.42	7/2/1984	S	0.3	25	6.92		7.7
8-NAR005.42	8/6/1984	S	0.3	25	**5.9**		7.6
8-NAR005.42	9/5/1984	S	0.3	21	6.69		12.4
8-NAR005.42	10/10/1984	S	0.3	18.5	6.1		6.2
8-NAR005.42	1/7/1985	S	0.3	8	6.06		11.1
8-NAR005.42	2/20/1985	S	0.3	4.5	**5.7**		12
8-NAR005.42	3/6/1985	S	0.3	6.5			12.2
8-NAR005.42	4/3/1985	S	0.3	10	6.5		11.4
8-NAR005.42	5/7/1985	S	0.3	20	6.5		9.9
8-NAR005.42	6/17/1985	S	0.3	22.7	6.8		7.8
8-NAR005.42	7/9/1985	S	0.3	24	6.2		8.1
8-NAR005.42	8/27/1985	S	0.3	24	6.4		7.6
8-NAR005.42	9/24/1985	S	0.3	20.9	6.7		8.6
8-NAR005.42	10/22/1985	S	0.3	15.7	**5.95**		**1**
8-NAR005.42	12/2/1985	S	0.3	11	6.5		11.1
8-NAR005.42	1/7/1986	S	0.3	3	6.3		13
8-NAR005.42	2/4/1986	S	0.3	6	6.6		11.8
8-NAR005.42	3/4/1986	S	0.3	6	6.7		12.3
8-NAR005.42	4/1/1986	S	0.3	16	6.9		10.4
8-NAR005.42	5/5/1986	S	0.3	16	7.06		8.9
8-NAR005.42	6/12/1986	S	0.3	27	7.51		7.5
8-NAR005.42	7/1/1986	S	0.3	24	7.58		7.8
8-NAR005.42	8/12/1986	S	0.3	24	7.47		7.4
8-NAR005.42	9/11/1986	S	0.3	22	7.7		8.9
8-NAR005.42	10/15/1986	S	0.3	16.5	7.5		8
8-NAR005.42	11/6/1986	S	0.3	9	7.25		10.1
8-NAR005.42	12/8/1986	S	0.3	5	7.6		11.8
8-NAR005.42	1/15/1987	S	0.3	9	7.56		11.1
8-NAR005.42	2/10/1987	S	0.3	3.7	7.24		12.4
8-NAR005.42	3/9/1987	S	0.3	11	7.81		10.5
8-NAR005.42	4/27/1987	S	0.3	14.5	7.35		10
8-NAR005.42	5/13/1987	S	0.3	20.5	7.3		8.2
8-NAR005.42	6/10/1987	S	0.3	22.8	7.1		6
8-NAR005.42	7/22/1987	S	0.3	29	6.63		4.2
8-NAR005.42	8/6/1987	S	0.3	27.4	7		7.3
8-NAR005.42	9/14/1987	S	0.3	25	7.49		7.6
8-NAR005.42	10/13/1987	S	0.3	11.5	7.86		10
8-NAR005.42	11/18/1987	S	0.3	14	8.06		10.5
8-NAR005.42	12/22/1987	S	0.3	9	8.54		11.2
8-NAR005.42	1/12/1988	S	0.3	1	8.16		15.2

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler
8-NAR005.42	3/28/1988	S	0.3	12.1	7.64		10.2
8-NAR005.42	4/27/1988	S	0.3	17.5	7.58		9.6
8-NAR005.42	5/10/1988	S	0.3	19	7.29		8.7
8-NAR005.42	6/6/1988	S	0.3	21	8.82		8.3
8-NAR005.42	7/6/1988	S	0.3	24.5	7.1		8.2
8-NAR005.42	8/23/1988	S	0.3	22.8	7.57		7.6
8-NAR005.42	9/19/1988	S	0.3	22	7.28		8.6
8-NAR005.42	10/6/1988	S	0.3	14	7.25		9.6
8-NAR005.42	1/25/1989	S	0.3	4.9	6.82		14.3
8-NAR005.42	2/16/1989	S	0.3	10.2	7.31		11.5
8-NAR005.42	4/19/1989	S	0.3	15.6	7.86		10.8
8-NAR005.42	5/16/1989	S	0.3	14.5	7.3		9.6
8-NAR005.42	6/15/1989	S	0.3	25.5	7		7.6
8-NAR005.42	7/25/1989	S	0.3	28.2	7		7.2
8-NAR005.42	8/14/1989	S	0.3	23.2	7.32		9.2
8-NAR005.42	9/14/1989	S	0.3	24.7	6.74		7
8-NAR005.42	10/10/1989	S	0.3	11.7	7.65		11.4
8-NAR005.42	11/15/1989	S	0.3	17.3	7.33		10.2
8-NAR005.42	12/14/1989	S	0.3	4.7	7.4		13.3
8-NAR005.42	1/10/1990	S	0.3	6.5	7.05		12.6
8-NAR005.42	2/7/1990	S	0.3	10	7.3		12.5
8-NAR005.42	3/7/1990	S	0.3	8.2	7.9		12.7
8-NAR005.42	4/12/1990	S	0.3	12	7.86		10.7
8-NAR005.42	5/15/1990	S	0.3	18.9	6.46		8.7
8-NAR005.42	6/12/1990	S	0.3	21.1	7.73		8.2
8-NAR005.42	7/17/1990	S	0.3	25.7	7.34		7.2
8-NAR005.42	8/14/1990	S	0.3			7.43	
8-NAR005.42	8/14/1990	B	1	25.78	6.97	7.43	
8-NAR005.42	9/17/1990	S	0.3	20.1	7.36	7.95	8
8-NAR005.42	10/15/1990	S	0.3	21.2	6.84	7.5	
8-NAR005.42	11/28/1990	S	0.3	12.6	7.04	10.16	10.2
8-NAR005.42	12/17/1990	S	0.09	9.5	7.34	11.75	11.8
8-NAR005.42	3/13/1991	S	0.09	7.69	7.39	11.53	11.5
8-NAR005.42	3/13/1991	B	304.5	7.7	7.39		11.5
8-NAR005.42	4/10/1991	S	0.09	19.75	7.31	8.91	8.91
8-NAR005.42	5/8/1991	S	0.09	19.3	6.95	8.27	8.3
8-NAR005.42	6/5/1991	S	0.3	22.09	7.28		7.79
8-NAR005.42	7/1/1991	S	0.3	27.49	6.92	7.06	
8-NAR005.42	8/5/1991	S	0.3	25.62	6.4	7.11	
8-NAR005.42	9/4/1991	S	0.3	21.5	6.83	8.77	
8-NAR005.42	9/30/1991	S	0.3	18.17	7.43	8.87	
8-NAR005.42	12/3/1991	S	0.3	11.57	6.67	9.6	
8-NAR005.42	1/6/1992	S	0.3	7.03	6.37	11.79	
8-NAR005.42	2/18/1992	S	0.3	6.8	6.45	11.88	
8-NAR005.42	3/4/1992	S	0.3	10.5	6.6	11.06	
8-NAR005.42	4/13/1992	S	0.3	15.9	6.39	10.05	
8-NAR005.42	5/11/1992	S	0.3	16.36	6.01	8.87	
8-NAR005.42	6/10/1992	S	0.3	22.86	6.66	7.49	
8-NAR005.42	7/7/1992	S	0.3	23.37	6.27	6.78	
8-NAR005.42	8/17/1992	S	0.3	21.12	6.02	7.89	
8-NAR005.42	9/2/1992	S	0.3	22.08	6.7	7.86	
8-NAR005.42	10/1/1992	S	0.3	14.9	6.53	9.33	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler
8-NAR005.42	11/3/1992	S	0.3	14.67	6.38	11.14	
8-NAR005.42	12/2/1992	S	0.3	8.15	6.74	11.2	
8-NAR005.42	1/5/1993	S	0.3	10.86	6.41	10.85	
8-NAR005.42	2/1/1993	S	0.3	5.82	6.61	11.89	
8-NAR005.42	3/3/1993	S	0.3	7.36	6.51	11.55	
8-NAR005.42	4/5/1993	S	0.3	11.05	6.38	10.1	
8-NAR005.42	5/4/1993	S	0.3	18.58	6.34	8.71	
8-NAR005.42	6/1/1993	S	0.3	20.93	6.26	7.89	
8-NAR005.42	7/12/1993	S	0.3	28.01	6.44	6.12	
8-NAR005.42	8/9/1993	S	0.3	23.28	6.23	7.32	
8-NAR005.42	9/1/1993	S	0.3	25.75	6.54	7.3	
8-NAR005.42	10/7/1993	S	0.3	14.82	6.89	9.89	
8-NAR005.42	11/2/1993	S	0.3	7.89	6.56	11.07	
8-NAR005.42	12/20/1993	S	0.3	6.72	6.78	12.03	
8-NAR005.42	1/31/1994	S	0.3	4.18	6.6	12.35	
8-NAR005.42	2/10/1994	S	0.3	4.99	6.61	12.35	
8-NAR005.42	3/7/1994	S	0.3	8.99	6.49	11.63	
8-NAR005.42	4/11/1994	S	0.3	15.17	6.47	9.55	
8-NAR005.42	5/11/1994	S	0.3	16.64	6.32	9.16	
8-NAR005.42	6/8/1994	S	0.3	25	6.51	6.81	
8-NAR005.42	7/11/1994	S	0.3	26.32	6.55	6.77	
8-NAR005.42	8/3/1994	S	0.3	25.62	6.41	6.64	
8-NAR005.42	9/12/1994	S	0.3	19.74	6.81	8.17	
8-NAR005.42	10/11/1994	S	0.3	14.01	6.65	9.13	
8-NAR005.42	11/1/1994	S	0.3	15.69	6.56	8.31	
8-NAR005.42	12/5/1994	S	0.3	9.9	6.75	10.65	
8-NAR005.42	1/4/1995	S	0.3	4.63	6.72	12.29	
8-NAR005.42	2/1/1995	S	0.3	4.69	6.5	12.68	
8-NAR005.42	3/22/1995	S	0.3	13.23	6.59	9.37	
8-NAR005.42	4/25/1995	S	0.3	13.76	6.91	10.25	
8-NAR005.42	5/24/1995	S	0.3	22.13	6.52	7.94	
8-NAR005.42	6/27/1995	S	0.3	25.14	6.42	7.41	
8-NAR005.42	7/26/1995	S	0.3	28.95	6.72	6.69	
8-NAR005.42	8/31/1995	S	0.3	25.15	6.85	7.34	
8-NAR005.42	9/27/1995	S	0.3	16.53	6.82	8.54	
8-NAR005.42	10/12/1995	S	0.3	16.62	6.65	8.06	
8-NAR005.42	11/8/1995	S	0.3	12.54	6.69	10.01	
8-NAR005.42	12/27/1995	S	0.3	3.84	6.65	12.78	
8-NAR005.42	1/31/1996	S	0.3	6.54	6.13	11.85	
8-NAR005.42	2/27/1996	S	0.3	8.34	6.36	10.69	
8-NAR005.42	3/25/1996	S	0.3	9.04	6.26	11.42	
8-NAR005.42	4/18/1996	S	0.3	13.96	6.56	10.32	
8-NAR005.42	5/30/1996	S	0.3	18.14	6.83	9.17	
8-NAR005.42	6/24/1996	S	0.3	27.5	6.71	6.86	
8-NAR005.42	7/29/1996	S	0.3	25.09	6.84	7.3	
8-NAR005.42	8/26/1996	S	0.3	24.52	6.6	6.9	
8-NAR005.42	9/24/1996	S	0.3	19.24	6.54	9.81	
8-NAR005.42	10/29/1996	S	0.3	16.58	6.46	7.53	
8-NAR005.42	11/25/1996	S	0.3	8.04	6.5	11.33	
8-NAR005.42	12/19/1996	S	0.3	9.39	6.57	10.9	
8-NAR005.42	1/27/1997	S	0.3	6.27	6.77	12.22	
8-NAR005.42	2/13/1997	S	0.3	6.07	6.8	12.83	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler
8-NAR005.42	3/17/1997	S	0.3	8.57	6.74	11.01	
8-NAR005.42	4/9/1997	S	0.3	13.3	6.63	9.76	
8-NAR005.42	5/5/1997	S	0.3	16.03	6.67	9.14	
8-NAR005.42	6/2/1997	S	0.3	20.21	6.35	7.94	
8-NAR005.42	8/4/1997	S	0.3	25.85	6.72	7.19	
8-NAR005.42	9/25/1997	S	0.3	17.86	6.96	9	
8-NAR005.42	10/22/1997	S	0.3	12.7	7.1	10.45	
8-NAR005.42	11/12/1997	S	0.3	13.64	6.77	9.46	
8-NAR005.42	12/8/1997	S	0.3	5.86	6.65	12.08	
8-NAR005.42	1/12/1998	S	0.3	8.65	6.61	11.46	
8-NAR005.42	2/12/1998	S	0.3	8.69	6.78	11.11	
8-NAR005.42	3/12/1998	S	0.3	8.62	6.3	11.57	
8-NAR005.42	4/13/1998	S	0.3	14.38	6.64	10.3	
8-NAR005.42	5/5/1998	S	0.3	16.69	6.49	8.81	
8-NAR005.42	6/1/1998	S	0.3	25.76	6.75	7.24	
8-NAR005.42	7/6/1998	S	0.3	26.01	6.66	7.11	
8-NAR005.42	8/19/1998	S	0.3	25.25	6.56	7.41	
8-NAR005.42	9/15/1998	S	0.3	23.23	6.71	6.84	
8-NAR005.42	10/6/1998	S	0.3	17.31	6.68	8.46	
8-NAR005.42	11/3/1998	S	0.3	11.68	6.5	9.57	
8-NAR005.42	12/14/1998	S	0.3	6.98	6.35	11.08	
8-NAR005.42	1/12/1999	S	0.3	1.88	6.12	13.52	
8-NAR005.42	2/9/1999	S	0.3	5.68	6.46	11.97	
8-NAR005.42	3/16/1999	S	0.3	9.1	6.17	11.6	
8-NAR005.42	4/19/1999	S	0.3	12.7	6.7	9.88	
8-NAR005.42	5/19/1999	S	0.3	20.28	6.48	8.08	
8-NAR005.42	6/22/1999	S	0.3	20.95	6.83	8.35	
8-NAR005.42	7/1/1999	S	0.3	24.89	6.84	6.64	
8-NAR005.42	8/3/1999	S	0.3	25.75	6.83	6.76	
8-NAR005.42	9/1/1999	S	0.3	20.21	6.93	8.66	
8-NAR005.42	10/18/1999	S	0.3	15.88	6.54	9.01	
8-NAR005.42	11/2/1999	S	0.3	14.58	6.28	8.75	
8-NAR005.42	12/28/1999	S	0.3	3.71	6.71	13.17	
8-NAR005.42	1/5/2000	S	0.3	9.81	6.79	10.38	
8-NAR005.42	2/3/2000	S	0.3	3.11	6.54	14.7	
8-NAR005.42	3/1/2000	S	0.3	10.8	7.07	10.95	
8-NAR005.42	4/12/2000	S	0.3	15.66	6.84	8.9	
8-NAR005.42	5/3/2000	S	0.3	17.86	6.93	8.93	
8-NAR005.42	6/7/2000	S	0.3	19.1	6.56	7.85	
8-NAR005.42	7/6/2000	S	0.3	26.18	6.7	6.66	
8-NAR005.42	8/8/2000	S	0.3	26.8	6.58	6.17	
8-NAR005.42	9/12/2000	S	0.3	22.74	6.75	6.58	
8-NAR005.42	10/16/2000	S	0.3	13.89	6.81	9.33	
8-NAR005.42	11/13/2000	S	0.3	9.64	6.79	9.77	
8-NAR005.42	1/16/2001	S	0.3	4.13	6.7	12.53	
8-NAR005.42	1/31/2001	S	0.3	7.65	6.89	11.76	
8-NAR005.42	3/12/2001	S	0.3	9.04	6.79	11.15	
8-NAR005.42	4/25/2001	S	0.3	18.4	6.84	7.57	
8-NAR005.42	6/11/2001	S	0.3	23.25	6.51	7.85	
8-NAR005.42	8/8/2001	S	0.3	29.3	7.2	7.92	
8-NAR005.42	10/4/2001	S	0.3	18.52	7	9.11	
8-NAR005.42	12/27/2001	S	0.3	0.91	6.11	13.57	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler
8-NAR005.42	2/5/2002	S	0.3	3.36	6.54	12.97	
8-NAR005.42	4/3/2002	S	0.3	18.96	6.97	9.51	
8-NAR005.42	6/26/2002	S	0.3	28.66	7.8		
8-NAR005.42	7/24/2002	S	0.3	26.25	6.65	4.98	
8-NAR005.42	11/13/2002	S	0.3	13	6.37	10.83	
8-NAR005.42	1/2/2003	S	0.3	7.84	6.59	11.34	
8-NAR005.42	3/11/2003	S	0.3	6.75	7.04	11.9	
8-NAR005.42	5/21/2003	S	0.3	18.61	6.6	8.75	
8-NAR005.42	7/10/2003	S	0.3	26.91	6.79	6.87	
8-NAR005.42	9/16/2003	S	0.3	22.41	6.94	7.65	
8-NAR005.42	11/13/2003	S	0.3	15.66	6.94	8.69	
8-NAR005.42	1/21/2004	S	0.3	3.69	7.17	12.94	
8-NAR005.42	4/19/2004	S	0.3	19.47	6.79	9.18	
8-NAR005.42	5/13/2004	S	0.3	23.27	6.86	7.94	
8-NAR005.42	7/13/2004	S	0.3	27.15	6.56	6.52	
8-NAR005.42	8/12/2004	S	0.3	26.26	6.71	7.31	
8-NAR005.42	9/16/2004	S	0.3	24.08	6.9	7.72	
8-NAR005.42	10/5/2004	S	0.3	19.65	6.55	9.19	
8-NAR005.42	12/1/2004	S	0.3	12.38	7.39	12.42	
8-NAR005.42	12/21/2004	S	0.3	3.66	8.64	13.14	
8-NAR005.42	1/19/2005	S	0.3	5.13	6.94	13.47	
8-NAR005.42	2/8/2005	S	0.3	7.78	6.34	11.65	
8-NAR005.42	3/17/2005	S	0.3	8.77	6.38	10.9	
8-NAR005.42	4/21/2005	S	0.3	19.3	6.72	8.65	
8-NAR005.42	5/31/2005	S	0.3	21.15	7.1	6.42	
8-NAR005.42	6/6/2005	S	0.3	24.39	6.39	6.54	
8-NAR005.42	8/3/2005	S	0.3	26.97	6.92	6.33	
8-NAR005.42	8/17/2005	S	0.3	26.11	6.82	6.54	
8-NAR005.42	9/26/2005	S	0.3	22.72	7.04	7.1	
8-NAR005.42	10/13/2005	S	0.3	18.02	7	8.44	
8-NAR005.42	11/7/2005	S	0.3	13.7	6.45	8.72	
8-NAR005.42	12/8/2005	S	0.3	5.98	7.2		
8-NAR005.42	1/30/2006	S	0.3	8.44	6.59	11.2	
8-NAR005.42	2/28/2006	S	0.3	6.67	6.94	12.4	
8-NAR005.42	3/23/2006	S	0.3	9.7	7.2	11.5	
8-NAR005.42	4/25/2006	S	0.3	18.5	7.4	8.6	
8-NAR005.42	6/28/2006	S	0.3	23.1	6.8	7.8	
8-NAR005.42	8/16/2006	S	0.3	26.3	7.3	7.5	
8-NAR005.42	10/16/2006	S	0.3	14.8	7.3	9.8	
8-NAR005.42	12/5/2006	S	0.3	7.6	6.9	11.4	
8-NAR005.42	1/4/2007	S	0.3	9.8	6.8	11.5	
8-NAR005.42	3/8/2007	S	0.3	7.3	6.2	11.2	
8-NAR005.42	3/20/2007	I	0	10.3	6.4	10.3	
8-NAR005.42	4/11/2007	I	0	10.4	6.7	10.6	
8-NAR005.42	4/16/2007	I	0	11.9	6.6	10.2	
8-NAR005.42	5/8/2007	S	0.3	15.6	6.8	8.8	
8-NAR005.42	5/16/2007	I	0	21.3	6.9	7.9	
8-NAR005.42	5/30/2007	I	0	23	6.8	7.2	
8-NAR005.42	6/28/2007	I	0	28.4	7	7	
8-NAR005.42	7/9/2007	I	0	27.1	6.9	7.4	
8-NAR005.42	7/12/2007	S	0.3	30.3	5.5	4.8	
8-NAR005.42	8/6/2007	I	0	26.4	7.1	6.5	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler
8-NAR005.42	9/5/2007	I	0	22.5	7	7.9	
8-NAR005.42	9/11/2007	S	0.3	26.2	7.2	7.4	
8-NAR005.42	10/9/2007	I	0	23.4	7.4	10	
8-NAR005.42	10/25/2007	I	0	16.8	6.6	7.7	
8-NAR005.42	10/29/2007	I	0	12.1	6.8	9.7	
8-NAR005.42	11/5/2007	I	0	10.9	6.9	10.5	
8-NAR005.42	11/26/2007	I	0	8	6.9	10.6	
8-NAR005.42	11/27/2007	S	0.3	12.1	6.7	10.6	
8-NAR005.42	1/7/2008	S	0.3	7.1	6.3	12	
8-NAR005.42	1/10/2008	I	0	7.2	7.1	11.8	
8-NAR005.42	1/29/2008	I	0	2.6	7.1	13.2	
8-NAR005.42	2/3/2008	I	0	4.2	7	11.9	
8-NAR005.42	2/26/2008	I	0	7.1	7.2	12.6	
8-NAR005.42	3/4/2008	S	0.3	12.5	6.5	11.8	
8-NAR005.42	3/6/2008	I	0	11.2	6.9	11.2	
8-NAR005.42	3/9/2008	I	0	7.9	6.9	11.2	
8-NAR005.42	3/12/2008	I	0	8.4	6.8	12	
8-NAR005.42	3/27/2008	I	0	13.6	7	10.5	
8-NAR005.42	4/9/2008	I	0	11.6	7	10.1	
8-NAR005.42	4/22/2008	I	0	15.5	6.6	9.1	
8-NAR005.42	4/24/2008	I	0	17.3	6.4	8.2	
8-NAR005.42	5/14/2008	I	0	16.3	6.6	8.3	
8-NAR005.42	5/20/2008	S	0.3	18.7	7.4	8.5	
8-NAR005.42	5/28/2008	I	0	22.4	6.8	7.6	
8-NAR005.42	6/24/2008	I	0	25.4	7	7.6	
8-NAR005.42	7/22/2008	I	0	28.1	7	7.2	
8-NAR005.42	7/30/2008	S	0.3	26.6	7.3	7.2	
8-NAR005.42	8/26/2008	I	0	24.2	7	6.9	
8-NAR005.42	9/8/2008	I	0	21.6	6.4	8.3	
8-NAR005.42	9/11/2008	S	0.3	22.1	6.4	8.1	
8-NAR005.42	9/23/2008	I	0	19.2	6.6	8.4	
8-NAR005.42	10/28/2008	I	0	10.5	6.7	10.4	
8-NAR005.42	11/4/2008	S	0.3	12.4	6.9	9.1	
8-NAR005.42	11/12/2008	S	0.3	10	7.1	9.1	
8-NAR005.42	11/20/2008	I	0	6	7.1	13.7	
8-NAR005.42	12/11/2008	I	0	9.3	7	10.8	
8-NAR005.42	12/13/2008	I	0	5.4	6.8	11.7	
8-NAR005.42	1/9/2009	I	0	7.5	7	10	
8-NAR005.42	1/27/2009	I	0	2.4	6.8	13.8	
8-NAR005.42	2/3/2009	S	0.3	6.7	7.6	12.6	
8-NAR005.42	2/24/2009	I	0	1.4	7.2	13.6	
8-NAR005.42	3/13/2009	I	0	10.1	7.2	11	
8-NAR005.42	3/16/2009	I	0	9.2	6.8	12.1	
8-NAR005.42	3/19/2009	I	0	10.8	7.1	11.1	
8-NAR005.42	3/24/2009	I	0	10.4	7	11.6	
8-NAR005.42	4/7/2009	S	0.3	12.6	6.4	7.9	
8-NAR005.42	4/21/2009	I	0	15.7	6.3		
8-NAR005.42	4/28/2009	I	0	22.7	6.6	7.4	
8-NAR005.42	5/8/2009	I	0	18.1	6.9	8.7	
8-NAR005.42	5/27/2009	I	0	22.3	7.1	8.2	
90th Percentile				**25.9**	**7.4**		
10th Percentile				**5.6**	**6.4**		

Sta Id	Collection Date Time	Depth Desc	Depth	Container Id Desc	Comment	00900 HARDNESS, TOTAL (MG/L AS CACO3) Value	Com Code
8-NAR005.42	06/12/1974 15:45	S	0.3	R	STORET DATA CONVERSION	2	
8-NAR005.42	01/25/1989 13:20	S	0.3	R	STORET DATA CONVERSION	16	
8-NAR005.42	02/16/1989 13:10	S	0.3	R	STORET DATA CONVERSION	18	
8-NAR005.42	03/09/1989 13:00	S	0.3	R	STORET DATA CONVERSION	18	
8-NAR005.42	04/19/1989 13:30	S	0.3	R	STORET DATA CONVERSION	16	
8-NAR005.42	05/16/1989 13:00	S	0.3	R	STORET DATA CONVERSION	16	
8-NAR005.42	06/15/1989 13:50	S	0.3	R	STORET DATA CONVERSION	18	
8-NAR005.42	08/14/1989 14:15	S	0.3	R	STORET DATA CONVERSION	20	
8-NAR005.42	09/14/1989 14:00	S	0.3	R	STORET DATA CONVERSION	16	
8-NAR005.42	10/10/1989 13:30	S	0.3	R	STORET DATA CONVERSION	24	
8-NAR005.42	11/15/1989 13:15	S	0.3	R	STORET DATA CONVERSION	16	
8-NAR005.42	12/14/1989 13:35	S	0.3	R	STORET DATA CONVERSION	16	
8-NAR005.42	01/10/1990 12:45	S	0.3	R	STORET DATA CONVERSION	16	
8-NAR005.42	02/07/1990 13:20	S	0.3	R	STORET DATA CONVERSION	18	
8-NAR005.42	03/07/1990 12:30	S	0.3	R	STORET DATA CONVERSION	18	
8-NAR005.42	04/12/1990 13:20	S	0.3	R	STORET DATA CONVERSION	30	
8-NAR005.42	05/15/1990 12:15	S	0.3	R	STORET DATA CONVERSION	18	
8-NAR005.42	06/12/1990 12:50	S	0.3	R	STORET DATA CONVERSION	18	
8-NAR005.42	07/17/1990 12:55	S	0.3	R	STORET DATA CONVERSION	22	
8-NAR005.42	09/17/1990 12:00	S	0.3	R	STORET DATA CONVERSION	26	
8-NAR005.42	10/15/1990 12:10	S	0.3	R	STORET DATA CONVERSION	53	
8-NAR005.42	11/28/1990 11:30	S	0.3	R	STORET DATA CONVERSION	26	
8-NAR005.42	12/17/1990 12:30	S	0.09	R	STORET DATA CONVERSION	22	
8-NAR005.42	01/15/1991 13:15	S	0.3	R	STORET DATA CONVERSION	24	
8-NAR005.42	02/05/1991 10:45	S	0.3	R	STORET DATA CONVERSION	20	
8-NAR005.42	03/13/1991 11:46	B	304.5	R	STORET DATA CONVERSION	22	
8-NAR005.42	03/13/1991 11:46	S	0.09	R	STORET DATA CONVERSION	22	
8-NAR005.42	04/10/1991 13:20	S	0.09	R	STORET DATA CONVERSION	40	
8-NAR005.42	05/08/1991 10:25	S	0.09	R	STORET DATA CONVERSION	46	
8-NAR005.42	06/05/1991 13:20	S	0.3	R	STORET DATA CONVERSION	26	
8-NAR005.42	08/05/1991 10:52	S	0.3	R	STORET DATA CONVERSION	34	
8-NAR005.42	09/04/1991 11:40	S	0.3	R	STORET DATA CONVERSION	34	
8-NAR005.42	12/03/1991 11:31	S	0.3	R	STORET DATA CONVERSION	26	
8-NAR005.42	01/06/1992 11:20	S	0.3	R	STORET DATA CONVERSION	18	
8-NAR005.42	02/18/1992 10:00	S	0.3	R	STORET DATA CONVERSION	24	
8-NAR005.42	03/04/1992 11:10	S	0.3	R	STORET DATA CONVERSION	24	
8-NAR005.42	04/13/1992 12:30	S	0.3	R	STORET DATA CONVERSION	20	
8-NAR005.42	05/11/1992 09:20	S	0.3	R	STORET DATA CONVERSION	26	
8-NAR005.42	06/10/1992 10:25	S	0.3	R	STORET DATA CONVERSION	32	
8-NAR005.42	07/07/1992 10:49	S	0.3	R	STORET DATA CONVERSION	28	
8-NAR005.42	08/17/1992 10:34	S	0.3	R	STORET DATA CONVERSION	22	
8-NAR005.42	09/02/1992 10:56	S	0.3	R	STORET DATA CONVERSION	2.6	
8-NAR005.42	10/01/1992 11:37	S	0.3	R	STORET DATA CONVERSION	43	
8-NAR005.42	11/03/1992 11:20	S	0.3	R	STORET DATA CONVERSION	34	
8-NAR005.42	12/02/1992 11:00	S	0.3	R	STORET DATA CONVERSION	19	
8-NAR005.42	01/05/1993 11:38	S	0.3	R	STORET DATA CONVERSION	21	
8-NAR005.42	02/01/1993 10:17	S	0.3	R	STORET DATA CONVERSION	28	
8-NAR005.42	03/03/1993 11:33	S	0.3	R	STORET DATA CONVERSION	24	
8-NAR005.42	04/05/1993 10:30	S	0.3	R	STORET DATA CONVERSION	16	
8-NAR005.42	05/04/1993 09:30	S	0.3	R	STORET DATA CONVERSION	20	
8-NAR005.42	06/01/1993 11:35	S	0.3	R	STORET DATA CONVERSION	21	
8-NAR005.42	07/12/1993 11:00	S	0.3	R	STORET DATA CONVERSION	24	
8-NAR005.42	08/09/1993 10:30	S	0.3	R	STORET DATA CONVERSION	20	
8-NAR005.42	09/01/1993 11:10	S	0.3	R	STORET DATA CONVERSION	18	
8-NAR005.42	10/07/1993 12:22	S	0.3	R	STORET DATA CONVERSION	26	
8-NAR005.42	11/02/1993 10:15	S	0.3	R	STORET DATA CONVERSION	38	
8-NAR005.42	12/20/1993 12:41	S	0.3	R	STORET DATA CONVERSION	20	
8-NAR005.42	01/31/1994 11:25	S	0.3	R	STORET DATA CONVERSION	14	
8-NAR005.42	02/10/1994 10:55	S	0.3	R	STORET DATA CONVERSION	16	
8-NAR005.42	03/07/1994 12:44	S	0.3	R	STORET DATA CONVERSION	14	
8-NAR005.42	04/11/1994 12:34	S	0.3	R	STORET DATA CONVERSION	15	

Sta Id	Collection Date Time	Depth Desc	Depth	Container Id Desc	Comment	00900 HARDNESS, TOTAL (MG/L AS CACO3) Value	Com Code
8-NAR005.42	05/11/1994 11:00	S	0.3	R	STORET DATA CONVERSION	16	
8-NAR005.42	06/08/1994 10:47	S	0.3	R	STORET DATA CONVERSION	16	
8-NAR005.42	07/11/1994 11:00	S	0.3	R	STORET DATA CONVERSION	17	
8-NAR005.42	08/03/1994 12:11	S	0.3	R	STORET DATA CONVERSION	18	
8-NAR005.42	09/12/1994 13:00	S	0.3	R	STORET DATA CONVERSION	26	
8-NAR005.42	10/11/1994 12:00	S	0.3	R	STORET DATA CONVERSION	18	
8-NAR005.42	11/01/1994 11:00	S	0.3	R	STORET DATA CONVERSION	19	
8-NAR005.42	12/05/1994 10:00	S	0.3	R	STORET DATA CONVERSION	19	
8-NAR005.42	01/04/1995 12:22	S	0.3	R	STORET DATA CONVERSION	18	
8-NAR005.42	02/01/1995 11:21	S	0.3	R	STORET DATA CONVERSION	16	
8-NAR005.42	03/22/1995 09:14	S	0.3	R	STORET DATA CONVERSION	14	
8-NAR005.42	04/25/1995 13:20	S	0.3	R	STORET DATA CONVERSION	20	
8-NAR005.42	05/24/1995 12:30	S	0.3	R	STORET DATA CONVERSION	20	
8-NAR005.42	06/27/1995 08:00	S	0.3	R	STORET DATA CONVERSION	15	
8-NAR005.42	07/26/1995 11:35	S	0.3	R	STORET DATA CONVERSION	22	
8-NAR005.42	08/31/1995 11:40	S	0.3	R	STORET DATA CONVERSION	25	
8-NAR005.42	09/27/1995 11:00	S	0.3	R	STORET DATA CONVERSION	13	
8-NAR005.42	10/12/1995 10:45	S	0.3	R	STORET DATA CONVERSION	23	
8-NAR005.42	11/08/1995 10:00	S	0.3	R	STORET DATA CONVERSION	22	
8-NAR005.42	12/27/1995 10:00	S	0.3	R	STORET DATA CONVERSION	16	
8-NAR005.42	01/31/1996 12:05	S	0.3	R	STORET DATA CONVERSION	16	
8-NAR005.42	02/27/1996 10:20	S	0.3	R	STORET DATA CONVERSION	14	
8-NAR005.42	03/25/1996 09:45	S	0.3	R	STORET DATA CONVERSION	22	
8-NAR005.42	04/18/1996 12:30	S	0.3	R	STORET DATA CONVERSION	13	
8-NAR005.42	05/30/1996 11:30	S	0.3	R	STORET DATA CONVERSION	30	
8-NAR005.42	06/24/1996 09:00	S	0.3	R	STORET DATA CONVERSION	16	
8-NAR005.42	07/29/1996 10:30	S	0.3	R	STORET DATA CONVERSION	18	
8-NAR005.42	08/26/1996 08:45	S	0.3	R	STORET DATA CONVERSION	20	
8-NAR005.42	09/24/1996 07:37	S	0.3	R	STORET DATA CONVERSION	21	
8-NAR005.42	10/29/1996 12:50	S	0.3	R	STORET DATA CONVERSION	18	
8-NAR005.42	11/25/1996 10:00	S	0.3	R	STORET DATA CONVERSION	18	
8-NAR005.42	12/19/1996 11:11	S	0.3	R	STORET DATA CONVERSION	15	
8-NAR005.42	01/27/1997 13:22	S	0.3	R	STORET DATA CONVERSION	15.6	
8-NAR005.42	02/13/1997 09:54	S	0.3	R	STORET DATA CONVERSION	16.9	
8-NAR005.42	03/17/1997 07:55	S	0.3	R	STORET DATA CONVERSION	18.5	
8-NAR005.42	04/09/1997 11:11	S	0.3	R	STORET DATA CONVERSION	20.7	
8-NAR005.42	05/05/1997 11:44	S	0.3	R	STORET DATA CONVERSION	20.7	
8-NAR005.42	06/02/1997 10:31	S	0.3	R	STORET DATA CONVERSION	22	
8-NAR005.42	07/02/1997 11:55	S	0.3	R	STORET DATA CONVERSION	15.7	
8-NAR005.42	08/04/1997 11:44	S	0.3	R	STORET DATA CONVERSION	19.8	
8-NAR005.42	09/25/1997 15:23	S	0.3	R	STORET DATA CONVERSION	19.1	
8-NAR005.42	10/22/1997 11:30	S	0.3	R	STORET DATA CONVERSION	16.4	
8-NAR005.42	11/12/1997 12:55	S	0.3	R	STORET DATA CONVERSION	13.3	
8-NAR005.42	12/08/1997 12:33	S	0.3	R	STORET DATA CONVERSION	21	
8-NAR005.42	01/12/1998 14:15	S	0.3	R	STORET DATA CONVERSION	48	
8-NAR005.42	02/12/1998 11:01	S	0.3	R	STORET DATA CONVERSION	13.8	
8-NAR005.42	03/12/1998 13:00	S	0.3	R	STORET DATA CONVERSION	18	
8-NAR005.42	04/13/1998 12:40	S	0.3	R	STORET DATA CONVERSION	13.1	
8-NAR005.42	05/05/1998 11:50	S	0.3	R	STORET DATA CONVERSION	14	
8-NAR005.42	06/01/1998 14:22	S	0.3	R	STORET DATA CONVERSION	19.6	
8-NAR005.42	07/06/1998 12:15	S	0.3	R	STORET DATA CONVERSION	13.8	
8-NAR005.42	08/19/1998 11:45	S	0.3	R	STORET DATA CONVERSION	13.7	
8-NAR005.42	09/15/1998 09:30	S	0.3	R	STORET DATA CONVERSION	11.8	
8-NAR005.42	10/06/1998 10:22	S	0.3	R	STORET DATA CONVERSION	10.7	
8-NAR005.42	11/03/1998 11:44	S	0.3	R	STORET DATA CONVERSION	14	
8-NAR005.42	12/14/1998 10:33	S	0.3	R	STORET DATA CONVERSION	19	
8-NAR005.42	01/12/1999 10:33	S	0.3	R		44	
8-NAR005.42	02/09/1999 11:11	S	0.3	R		26	
8-NAR005.42	03/16/1999 12:15	S	0.3	R		36	
8-NAR005.42	04/19/1999 10:55	S	0.3	R		18	
8-NAR005.42	05/19/1999 13:35	S	0.3	R		20	

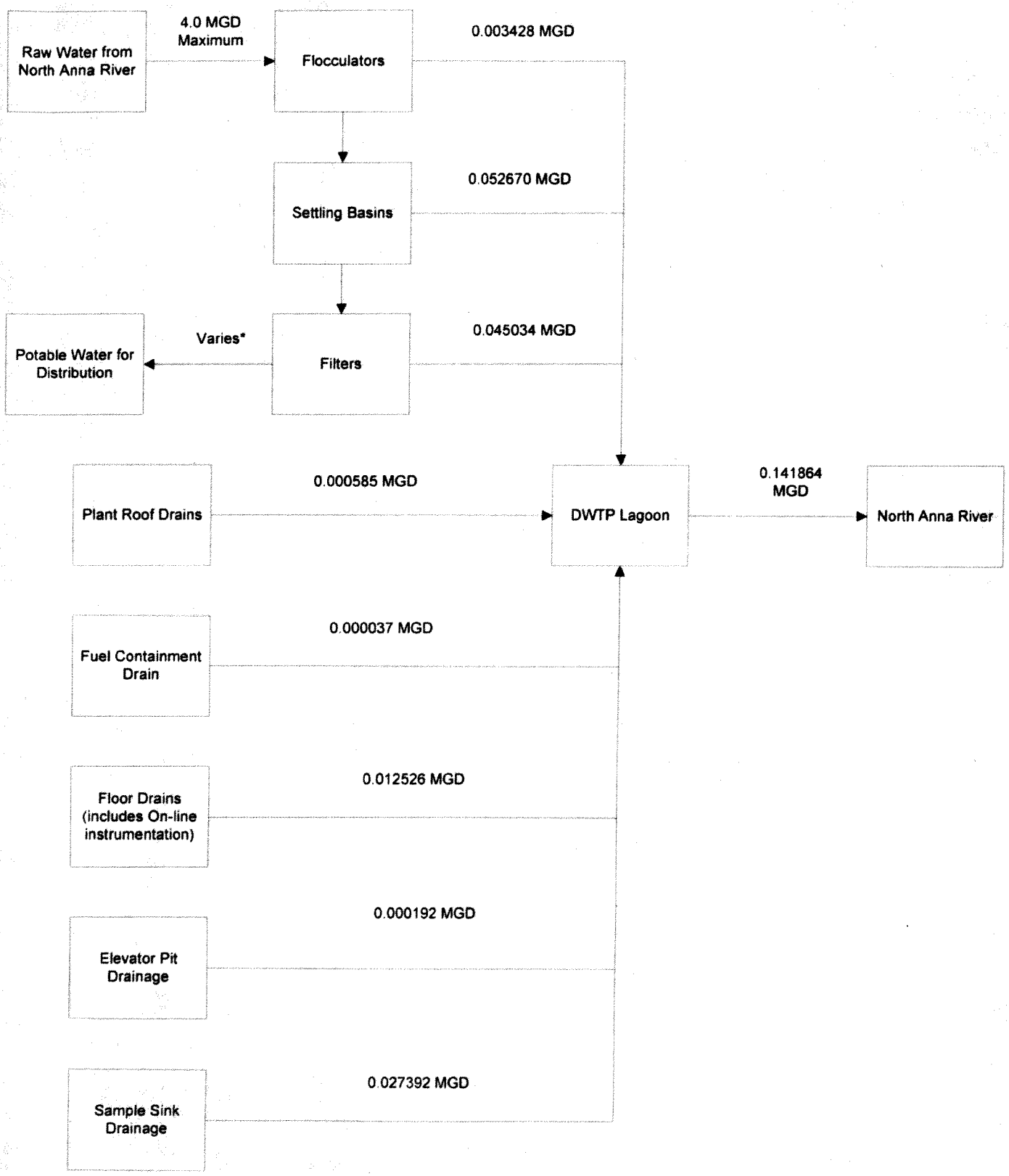
Sta Id	Collection Date Time	Depth Desc	Depth	Container Id Desc	Comment	00900 HARDNESS, TOTAL (MG/L AS CACO3) Value	Com Code
8-NAR005.42	06/22/1999 14:00	S	0.3	R		13.3	
8-NAR005.42	07/01/1999 11:44	S	0.3	R		12.5	
8-NAR005.42	08/03/1999 10:31	S	0.3	R		14.3	
8-NAR005.42	09/01/1999 12:00	S	0.3	R		9.8	
8-NAR005.42	11/02/1999 12:30	S	0.3	R		18.3	
8-NAR005.42	12/28/1999 14:40	S	0.3	R		18.9	
8-NAR005.42	01/05/2000 15:20	S	0.3	R		25.5	
8-NAR005.42	02/03/2000 12:00	S	0.3	R		18.2	
8-NAR005.42	03/01/2000 13:00	S	0.3	R		13	
8-NAR005.42	04/12/2000 11:45	S	0.3	R		13	
8-NAR005.42	05/03/2000 12:30	S	0.3	R		15	
8-NAR005.42	06/07/2000 10:45	S	0.3	R		16	
8-NAR005.42	07/06/2000 10:40	S	0.3	R		16.3	
8-NAR005.42	08/08/2000 10:20	S	0.3	R	NORMAL FLOW	16.6	
8-NAR005.42	09/12/2000 10:30	S	0.3	R		17.5	
8-NAR005.42	10/16/2000 10:30	S	0.3	R	NORMAL FLOW	17.7	
8-NAR005.42	11/13/2000 10:30	S	0.3	R		16	
8-NAR005.42	01/16/2001 12:00	S	0.3	R		14.6	
8-NAR005.42	01/31/2001 13:00	S	0.3	R		17.2	
8-NAR005.42	03/12/2001 12:10	S	0.3	R		14.5	
8-NAR005.42	04/25/2001 12:05	S	0.3	R		5.7	
8-NAR005.42	06/11/2001 12:45	S	0.3	R		7.1	
8-NAR005.42	08/08/2001 16:00	S	0.3	R	LOW FLOW	16.3	
8-NAR005.42	10/04/2001 14:30	S	0.3	R	LOW FLOW	17.5	
8-NAR005.42	12/27/2001 11:00	S	0.3	R	BELOW NORMAL FLOW	7.2	
8-NAR005.42	02/05/2002 13:20	S	0.3	R	LOW FLOW	12.9	
8-NAR005.42	04/03/2002 13:00	S	0.3	R	NORMAL FLOW	18	
8-NAR005.42	06/26/2002 14:15	S	0.3	R	LOW FLOW	15	
8-NAR005.42	07/24/2002 11:40	S	0.3	R		44.5	
8-NAR005.42	11/13/2002 14:10	S	0.3	R		22.8	
8-NAR005.42	01/02/2003 14:10	S	0.3	R	ABOVE NORMAL FLOW	15.5	
8-NAR005.42	03/11/2003 10:45	S	0.3	R	NORMAL FLOW	20.3	
8-NAR005.42	07/10/2003 13:00	S	0.3	R	NORMAL FLOW	21.4	
8-NAR005.42	09/16/2003 13:20	S	0.3	R	NORMAL FLOW	17.7	
8-NAR005.42	11/13/2003 15:25	S	0.3	R	NORMAL FLOW.	16	
8-NAR005.42	01/21/2004 13:10	S	0.3	R	NORMAL FLOW; COMPLETELY FREE AND CLEAR OF ANY ICE	19	
8-NAR005.42	04/19/2004 13:30	S	0.3	R		19.1	
8-NAR005.42	05/13/2004 12:15	S	0.3	R		16	
8-NAR005.42	07/13/2004 10:40	S	0.3	R	NORMAL FLOW.	18.5	
8-NAR005.42	08/12/2004 14:00	S	0.3	R	NORMAL FLOW; PH POST CALIBRATIONS FOR PH 4.01 AND 7.00 WERE 3.67 AND 6.70 RESPECTIVELY	17.5	
8-NAR005.42	09/16/2004 14:00	S	0.3	R	NORMAL FLOW.	14.7	
8-NAR005.42	10/05/2004 12:50	S	0.3	R		18.2	
8-NAR005.42	12/01/2004 10:40	S	0.3	R	NORMAL FLOW	16	
8-NAR005.42	12/21/2004 13:40	S	0.3	R		16	
8-NAR005.42	01/19/2005 10:40	S	0.3	R	ABOVE NORMAL FLOW.	15	
8-NAR005.42	02/08/2005 12:55	S	0.3	R	NORMAL FLOW	16	
8-NAR005.42	03/17/2005 11:00	S	0.3	R	NORMAL FLOW	16	
8-NAR005.42	04/21/2005 12:45	S	0.3	R		20.8	
8-NAR005.42	05/31/2005 11:20	S	0.3	R	NORMAL FLOW	16	
8-NAR005.42	06/06/2005 12:15	S	0.3	R	NORMAL FLOW	20	
8-NAR005.42	08/03/2005 11:10	S	0.3	R	LOW FLOW	20	
8-NAR005.42	08/17/2005 10:30	S	0.3	R	NORMAL FLOW	18	
8-NAR005.42	09/26/2005 12:20	S	0.3	R	LOW FLOW	18	
8-NAR005.42	10/13/2005 11:40	S	0.3	R	NORMAL FLOW	16	
8-NAR005.42	11/07/2005 11:05	S	0.3	R	NORMAL FLOW	18	
8-NAR005.42	12/08/2005 12:33	S	0.3	R	NORMAL FLOW	20	
8-NAR005.42	01/30/2006 11:00	S	0.3	R	NORMAL FLOW.	15	

						00900 HARDNESS, TOTAL (MG/L AS CACO3)	
Sta Id	Collection Date Time	Depth Desc	Depth	Container Id Desc	Comment	Value	Com Code
8-NAR005.42	02/28/2006 12:54	S	0.3	R	BELOW NORMAL FLOW	15	
8-NAR005.42	03/23/2006 12:03	S	0.3	R	LOW FLOW	18	
8-NAR005.42	04/25/2006 12:10	S	0.3	R	NORMAL FLOW	15	
8-NAR005.42	06/28/2006 10:25	S	0.3	R	FLOOD STAGE	20	
8-NAR005.42	08/16/2006 12:30	S	0.3	R	VERY LOW FLOW	16	
8-NAR005.42	10/16/2006 14:00	S	0.3	R	NORMAL FLOW	18	
8-NAR005.42	12/05/2006 12:10	S	0.3	R	NORMAL FLOW	17	
8-NAR005.42	01/04/2007 14:30	S	0.3	R	ABOVE NORMAL FLOW.	15	
Mean						**19**	

Attachment 3

Settling Lagoon Discharge Water Balance and Flow Diagram

Doswell Water Treatment Plant
Lagoon Discharge Water Balance and Flow Diagram
VA0025569



NOTE: Wastewater flow number are long term daily averages based on intermittent discharges and processes.

* Potable water produced and distributed varies based on daily process controls, seasonal demands and system/plant maintenance. This value can not be calculated as part of the water balance due to clear well and storage tank capacities.

Attachment 4

Settling Lagoon Sludge Removal Plan

95569

Chamberlain,Corwin

From: VanGelder, David F. [dfvangelder@co.hanover.va.us]
Sent: Monday, December 01, 2003 3:21 PM
To: Chamberlain,Corwin
Cc: England, Jonathan
Subject: Doswell WTP

Corey: as we explained during an earlier conversation we have augmented our drying process at the Doswell water treatment plant (e.g. installed a drain system, ~12" of #3 stone and restored the original foot print) and will be pumping sludge from the lagoons to the barrow pit tomorrow. Please let us know if you have any concerns - I also left a message in your voice mail. Thanks -

David F. Van Gelder
Hanover County DPU
P.O. Box 470
7516 County Complex Rd.
Hanover, VA 23069-0470

PH 804-365-6235
FX 804-365-6263

25569 R/G -R

HANOVER COUNTY
DEPARTMENT OF PUBLIC UTILITIES
P. O. BOX 470
HANOVER, VA 23069-0470
WEB SITE: www.co.hanover.va.us

FRANK W. HARKSEN, JR.
DIRECTOR OF PUBLIC UTILITIES

PUBLIC UTILITIES OFFICE
PHONE: (804) 365-6019
FAX: (804) 365-6245

November 25, 2002

RECEIVED
NOV 27 2002
PRO

Mr. Corwin Chamberlain
DEQ – Piedmont Regional Office
4949-A Cox Road
Glen Allen, Virginia 23060

RE: Hanover County Doswell WTP (VA0025569); Lagoon Operation SOP

Dear Mr. Chamberlain:

Included with this letter is the final version of the "Lagoon Sludge Removal Plan" for the Doswell Water Treatment Plant as we discussed. We have incorporated all of the changes you recommended and assume that we can now move forward with the removal operation.

As requested, we have scheduled that actual removal process to start on December 5, 2002. We anticipate that pumping should begin at approximately 10 am. Mr. England will contact you if there is any deviation from this schedule

We appreciate your quick response and assistance with this effort. Please call me with any questions or concerns you may have at 804-365-6235.

Sincerely,

David F. Van Gelder
Chief of Operations & Maintenance

cc: Jonathan England – Superintendent - DWTP
DEQ correspondence file

attachments

Lagoon Sludge Removal Plan for the Doswell Water Treatment Plant
VPDES permit # - VA0025569

Overview:

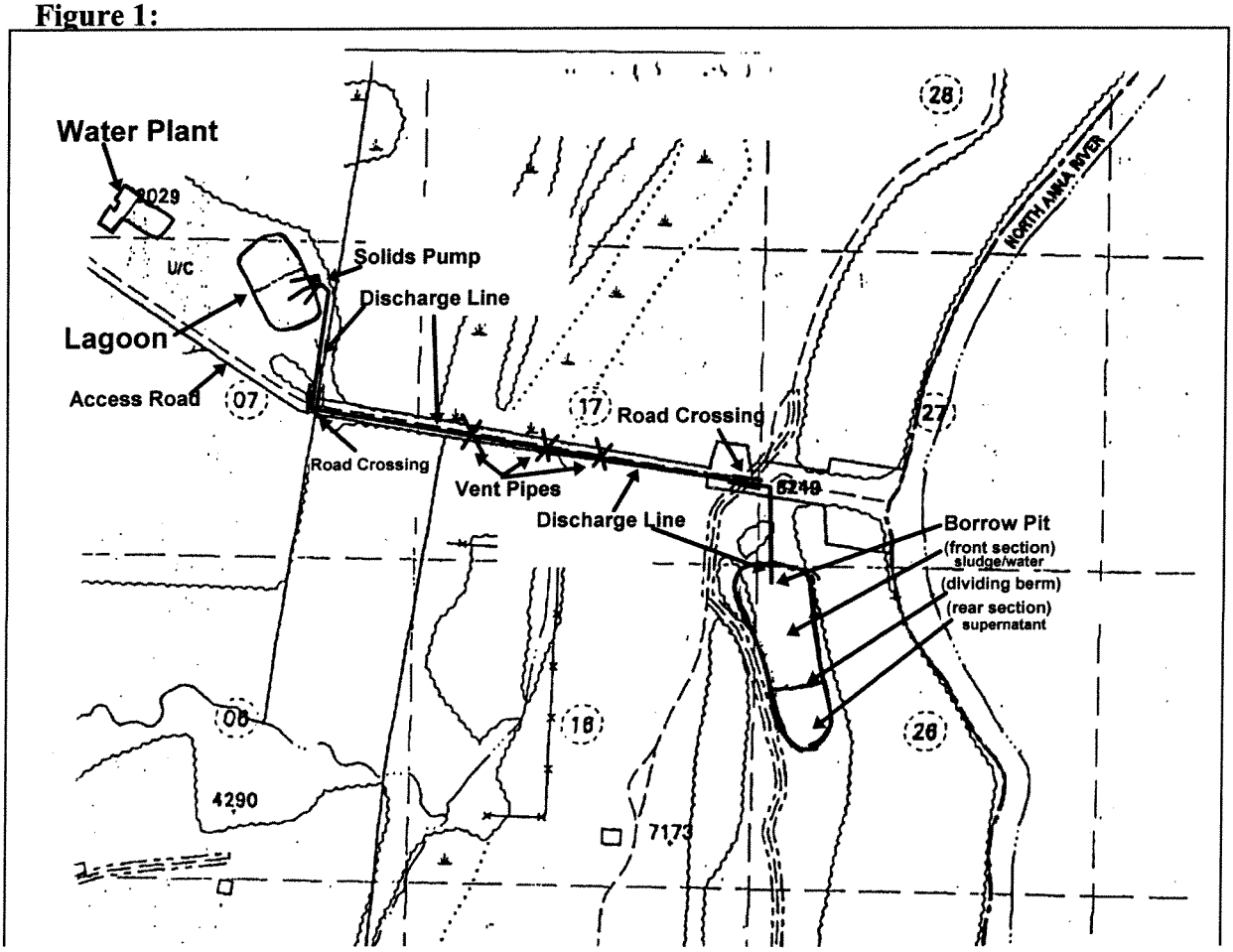
Lagoon Description:

The Doswell Water Treatment Plant is rated at 4 .0 MGD. It operates a two cell lagoon on county property adjacent to the plant. The lagoon has a capacity of 1.2 MG per cell for a total capacity of 2.4 MG. All Plant process wastes (mostly alum sludge) are delivered to the lagoon where the solids are allowed to settle out and the supernatant is discharged back to the North Anna River. This lagoon is permitted by Virginia DEQ under VPDES permit # - VA0025569 effective March 19, 1999 – March 19, 2004.

Sludge Removal:

Hanover Public Utilities will perform this process to remove accumulated waste from the lagoon on a regular basis (e.g. annually). The sludge will be pumped to the drying area (Barrow Pit) located on land adjacent to the raw water pump house which is under long term lease. The Borrow pit is constructed with earthen berms measuring approx 5 feet high and 4 – 5 feet wide. It is split into 2 sections, a large front section where the sludge is pumped and a smaller rear section where clear supernatant shall be pumped from the large section after all solids have settled out. Once the sludge has been moved from the lagoons to the borrow pit, it will be allowed to stand and settle. When the sludge has settled out the clear supernatant will be pumped off from the large section of the pit to the smaller section. The accumulated supernatant will then dissipate through evaporation and infiltration. When the sludge has dried it shall be removed using heavy equipment and transported to a landfill for proper disposal.

Figure 1:



Sludge Removal Plan:

Equipment List:

1) 1- Godwin, CD150M Dri-Prime Solids Pump (**see fig #2 & #3**)
2) 8" flexible suction hose.
3) 2" flexible return hose.
4) 2- 2" return line throttling valves
5) 6" Bauer Quick-Coupling galvanized discharge pipe. (**see fig #4 & #5**)
6) 2- Road Crossings.
7) 3- 3'sections of 4" PVC scdl 40 pipe (for vent pipes). (**see fig #6**)
8) 3- 4" Fernco Couplings (for connection of vent pipes to 6" line). (**see fig #6**)
9) 3- 6"x4"Bauer Quick-Coupling galvanized "T"s (for connection of vent pipes to 6" line). (**see fig #6**)
10) 1- Dewatering pump with suction and discharge hoses (for pumping off the supernatant from the front section of the pit to the rear section).
11) Orange safety cones (to mark the discharge line along the access road).
12) Measuring device to measure the sludge level in the barrow pit and the lagoon.

Pre-Removal Requirements:

1) The Borrow Pit area must be free of all previous loading of sludge and the area should be inspected for any damage to the berms. The floor of the pit should be fairly level and free of major ruts. Any deficiencies shall be corrected prior to pumping any new sludge in to the pit.
2) DEQ approval must be obtained prior to the removal of any sludge. Three weeks should be allowed for a site visit if requested
3) If a County contractor is to be used for the Removal, you will need to go over the plan with the contractor, including a site visit. At least 2 weeks notice will be needed for the contractor.
4) Rental Pumping Equipment: at least 2 weeks notice will be needed.
5) Public Utilities equipment: all of the equipment will need to be inventoried and inspected at least 4 weeks prior to removal. This will allow for repairs or replacement of items if needed.
6) Traffic on the access road should be limited to plant and sludge removal personnel only during the process to minimize possible damage to the discharge line and the workers.
7) Just prior to initiating the removal process, the lagoon cell to be cleaned first should have a minimum of (TBD)' of water above the sludge blanket. This is to insure enough water to re-circulate for agitating the sludge.

Sludge Removal Plan:

Removal Process (from the lagoon to the Barrow Pit):

NOTE – The lagoon cell to be cleaned should be isolated at the splitter box. Both of the cell's discharge valves should be completely closed and the water level in the cell should be (TBD) inches below the discharge chimney as to ensure that none of the agitation from the re-circulating pumps will cause water to overflow.

NO LIQUIDS ARE TO BE ALLOWED TO LEAVE THE CELL THROUGH THE LAGOON GRAVITY DISCHARGE LINE.

ALL MATERAL IS TO BE REMOVED BY THE PUMP SYSTEM ONLY! FAILURE TO INSURE THIS MAY RESULT IN AN UNAUTHORIZED DISCHARGE .

(see fig #7)

1) The 8" pump suction hose is placed into the sludge blanket of the lagoon cell as far down as possible.
2) While the pump is pumping the 2 valves on the 2"return lines are adjusted to maintain proper amount of flow for keeping the sludge well agitated as well as pushing the sludge towards the end of the suction hose.
3) To ensure efficient sludge removal, the suction hose should be moved to different areas of the cell as required. When needed the suction hose will have to be moved to different areas of the cell.
4) The entire length of the discharge line should be inspected for any leakage on a routine basis. If a leak should occur the pump is to be shut down immediately, any leaked material is to be contained and cleaned up, and the leak is to be repaired before restarting the removal process.
5) Sludge flow entering the borrow pit should be monitored on a regular basis. The end of the discharge hose should to be moved around to ensure equal distribution of the sludge in the pit.
6) **AT NO TIME IS THERE TO BE LESS THAN 2' OF FREEBOARD ON THE BERMS OF THE PIT!**
7) Measurements of the sludge level are to be taken periodically in the lagoon cell and in the pit. If the sludge level in the borrow pit reaches ½', pumping should be stopped and the equipment moved and set up on the 2nd lagoon cell. The maximum sludge level in the borrow pit should not exceed (TBD; Start with 1' target).
8) When the sludge pumping has been completed, the pump system shall be flushed out to the borrow pit. This is accomplished by setting the suction hose in the lagoon and pumping supernatant only through the lines until water only is observed discharging from the end of the line into the pit.
9) All equipment should be cleaned, inspected, and either returned or put back into storage.
10) Records should be kept recording the removal of the sludge. Time and dates of removal, before and after measurements of the sludge levels in the lagoon and in

the pit, any equipment or process problems that occurred as well as actions taken to remedy the problem/s.

Sludge Removal Plan:

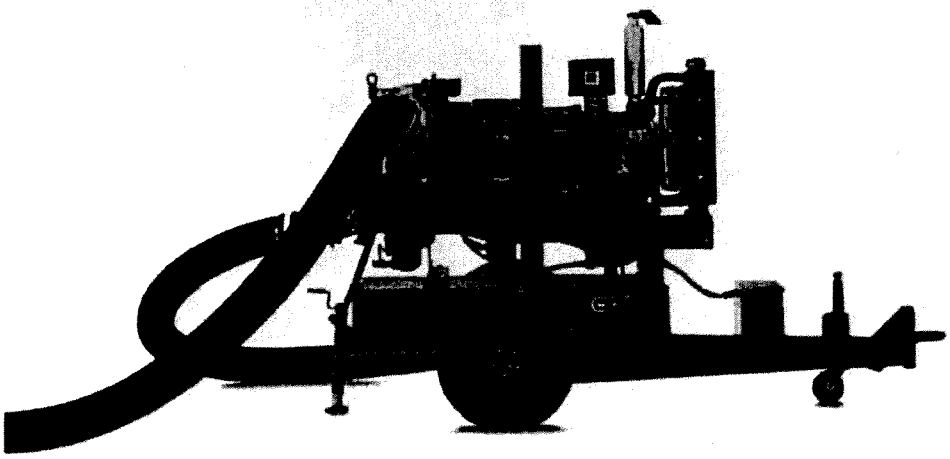
Removal Process (removing dried sludge from the borrow pit):

1) After the last of the sludge has been pumped into the borrow pit, it shall be left undisturbed to allow the solids to settle out to the bottom. Once this has occurred, a dewatering pump should be set up on the dividing berm between the front and rear sections of the pit and the suction hose set into the front section to allow the clear supernatant to be pumped into the rear section of the pit. A minimum of 2' of freeboard is to be maintained at all times. The pumping off of the supernatant may need to be repeated several times. The water in the rear berm should then be allowed to dissipate through evaporation and infiltration.
2) The borrow pit should be routinely inspected and the sludge checked for dryness.
3) Over time the sludge in the front section of the pit will dry out to the point where it forms a crust on the surface. The sludge should be further inspected at this point by digging several holes around the pit and checking the consistency of the lower levels of the sludge. Once the consistency of the sludge in the lower levels is that of wet clay a sample should be collected and taken to a lab for TCPL testing (include a paint filter test). These test are required by EPA landfill regulations.
4) When the sludge has reached the point where it has passed the required testing, a work order should be generated to have the sludge loaded onto trucks and hauled to the landfill. You will need to contact the landfill at least two weeks prior to having the sludge hauled to obtain a hauling manifest which will allow the sludge to be hauled to the landfill. The manifest will be faxed to the plant.
5) Once all of the sludge has been removed from the pit, DEQ is to be notified by letter that the process has been completed.
6) The entire borrow pit area is to be inspected especially the berms and any problems are to be addressed.

Fig #2

CD150M

CD150M Dri-Prime® Pumps



The Godwin Dri-Prime® 6" CD150M automatic priming centrifugal pump is clearly the backbone of the temporary portable pumping industry. With solids-handling to 3," maximum flows of 1750 gallons per minute and 165 feet of total dynamic head, and indefinite dry-running capabilities, the CD 150M can be found in a wide variety of applications from straight dewatering to sewage bypassing. Mounted on a highway trailer, the CD150M is the most maneuverable and versatile portable pumping system available, making it a favorite of contractors, municipalities, industry and environmental companies across the country.

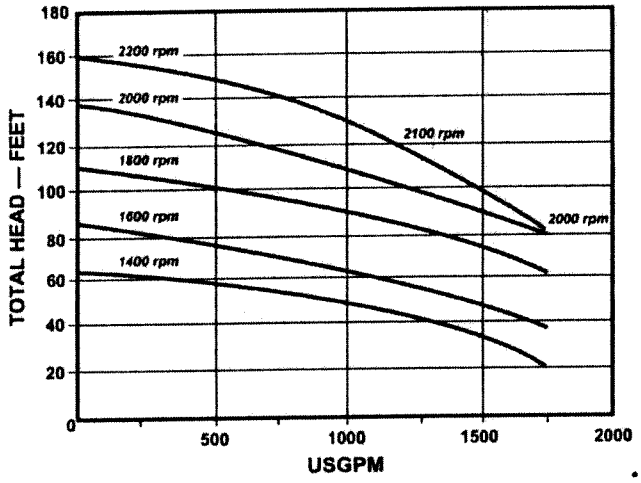
Features

- Close coupled centrifugal pump with vacuum priming compressor mounted to a diesel engine. Also available in electric drive or as bare shaft pumpend.
- All cast iron construction with cast chromium steel impeller.
- Extensive application flexibility — will handle raw sewage, slurries and liquids with solids up to 3" diameter.
- Continuously operated "Godwin" patented air ejector priming device requiring no periodic adjustment or control.
- Dry running, oil bath, mechanical seal with abrasion resistant solid silicon carbide interfaces.
- Solids handling ball type Non Return Valve with renewable flexible rubber seat and quick release access feature.
- Compact unit mounted on skid base or two wheeled highway trailer both incorporating integral overnight running fuel tank.
- Very simple maintenance — normally confined to checking engine and seal cavity oil levels.
- Standard engine — John Deere 4045D. Available with a variety of engines including Lister, Hatz, Perkins and Deutz.
- Super-quiet critical silence pack version available for use in residential communities.

godwin pumps

Fig #3

CD150M Performance Curve



Performance Table

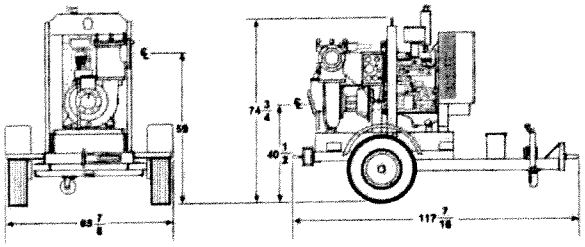
Diesel Set — John Deere 4045D, 71 hp @ 2200 rpm
Impeller Diameter — 10.8"

	Total Delivery Head — Feet				
Total Suction	10	20	30	40	50
Head — Feet	Output — GPM				
10	1960	1900	1850	1800	1680
15	1850	1810	1700	1520	1400
20	1670	1590	1500	1380	1240
25	1500	1400	1340	1240	1100

Performance data listed in table and curves are based on water tests at sea level and 68° F (20° C). Larger diameter pipes may be required for maximum flows.

Dimensions

CD150M — John Deere 4045D, GP 60 Highway Trailer
Weight: 2750 lb.



All dimensions listed in inches

Specifications

Maximum Operating Speed:
2200 rpm
Maximum Operating Temperature:
+212° F (100° C)
Maximum Working Pressure:
58.5 psi
Maximum Suction Pressure:
70.0 psi
Maximum Casing Test Pressure:
88.0 psi
Fuel Tank Capacity:
30 to 100 gallons (60 gallon standard)
Fuel Consumption:
3.0 gph @ 2000 rpm (full load)
Pipe Connections:
6" ASA 150#
Solids Handling:
3" dia., standard impeller

Materials

Pump casing, suction cover, separation tank and wearplates:
Close grained cast iron
Impeller:
Cast chromium steel hardened to minimum Brinell 341 HB
Shaft:
1 1/2% nickel/chromium steel
Non Return Valve Body, Ejector Housing:
Close-grained cast iron
Non Return Valve -Ball and Seat:
High nitrile rubber
Mechanical Seal Faces:
Solid silicon carbide

godwin pumps

One Floodgate Road, Bridgeport, NJ 08014
Tel: (609) 467-3636 • Fax: (609) 467-4841
www.godwinpumps.com
BRANCH LOCATIONS:
Norwich, CT • Batavia, NY • Frankfort, IL
Upper Marlboro, MD • Richmond, VA • Virginia Beach, VA • Charleston, WV • N. Charleston, SC
Atlanta, GA

GPASL.016.1298

Fig #4

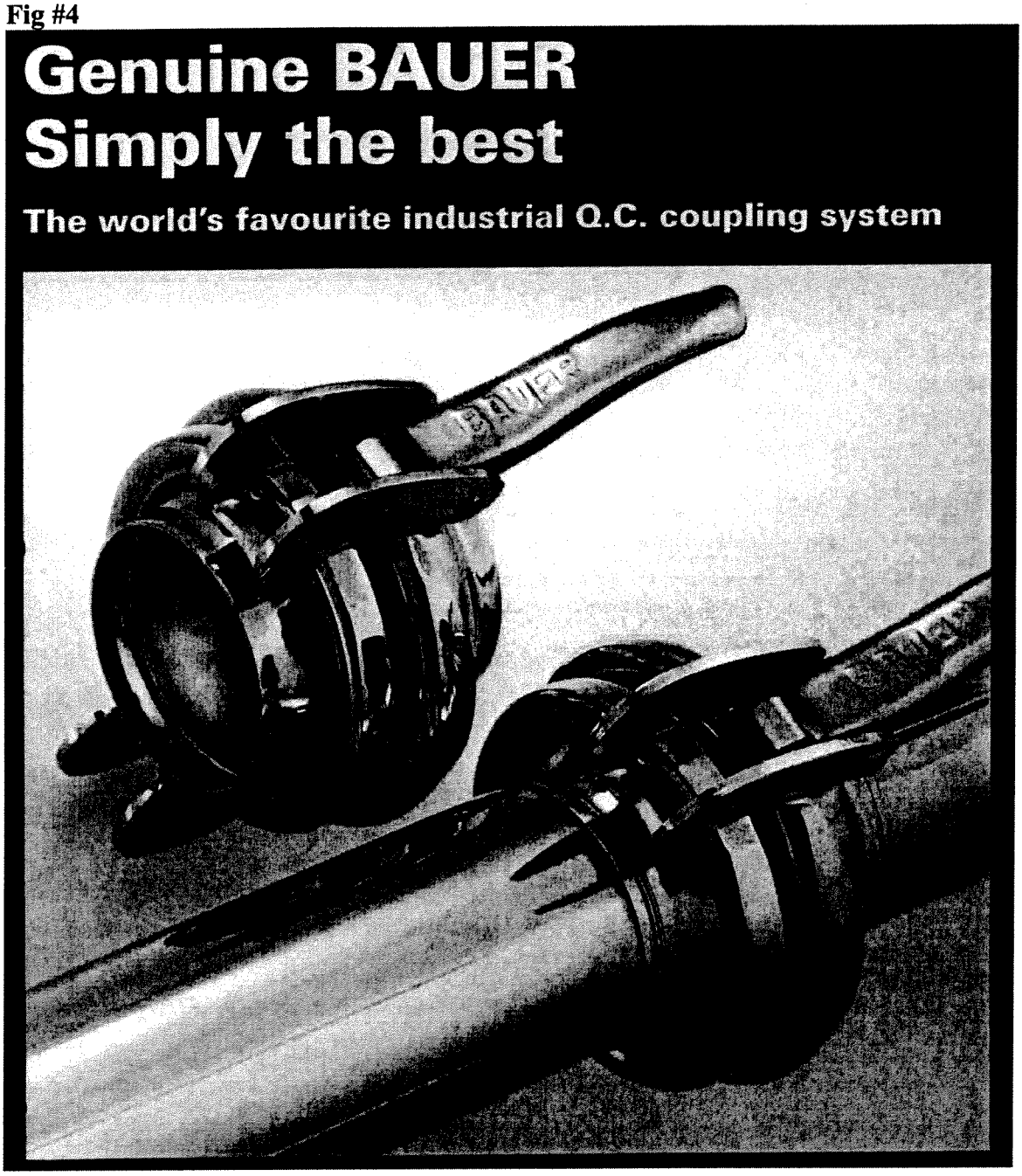
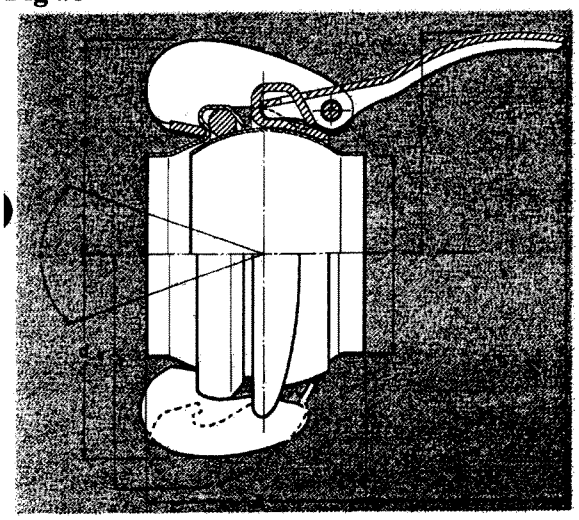
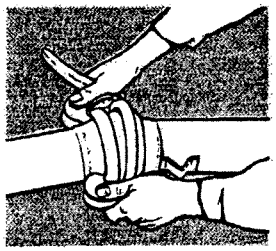
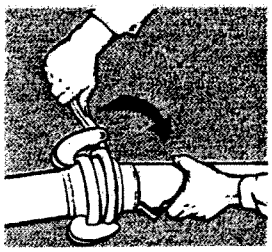

Genuine BAUER
Simply the best
The world's favourite industrial Q.C. coupling system
BAUER

Fig #5

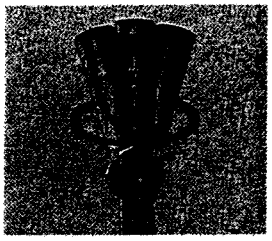




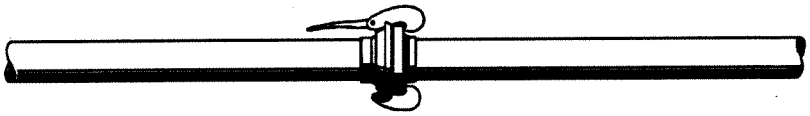


Unmatched efficiency

Genuine BAUER HK couplings are quickly and easily coupled/ uncoupled with a few simple hand movements, providing great flexibility of installation – even on difficult sites – with articulation on coupling joint up to 30°.



Pipe installation system



Genuine BAUER HK/HKS Quick-coupling Pipes, hot dip galvanised, standard length 6 m

Fig #6

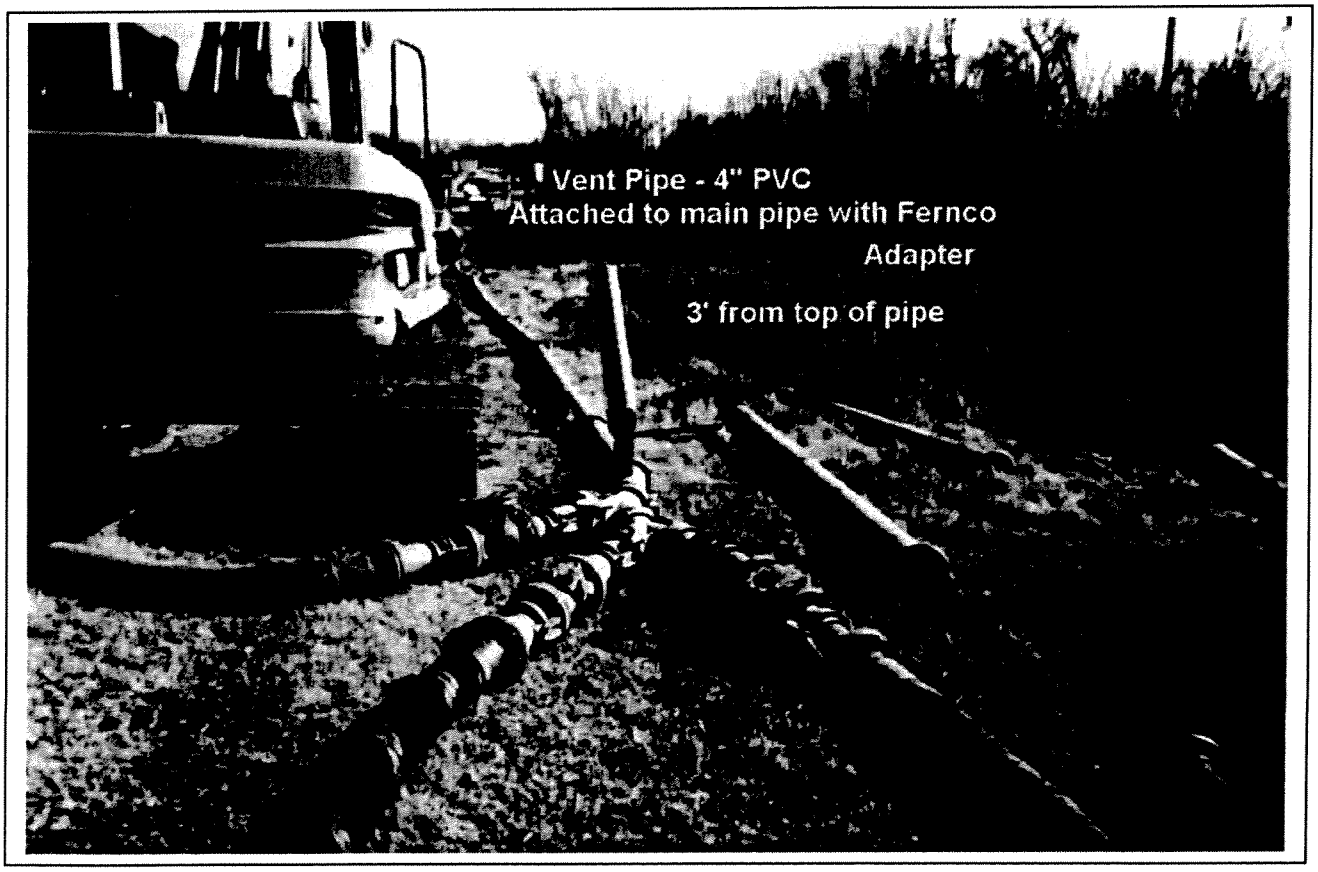


Fig #7

godwin pumps
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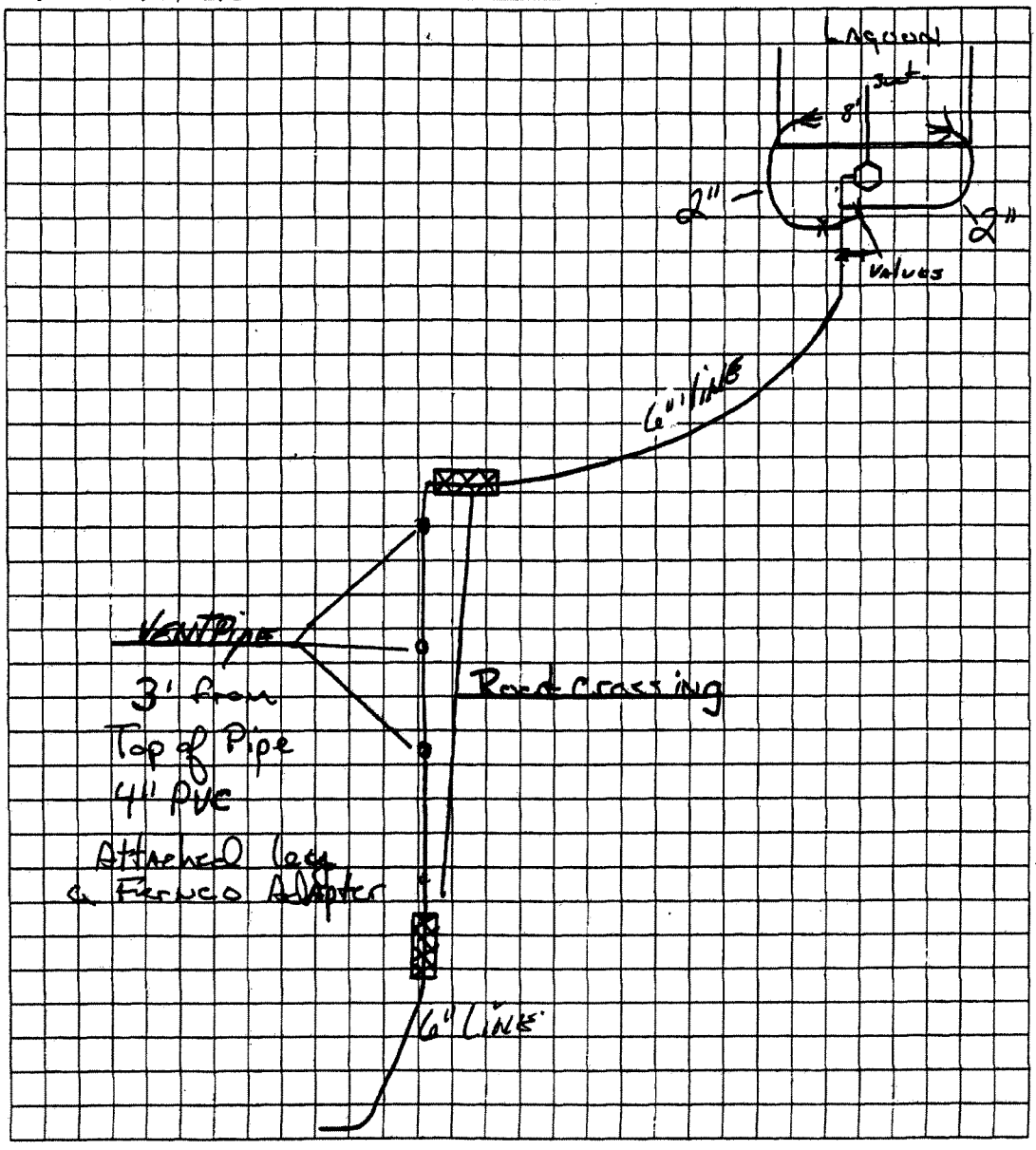
Project: HANOVER WTP Date: 9-20-02



Attachment 5

Facility Inspection Report (March 10, 2009)

Virginia Department of Environmental Quality

WASTEWATER FACILITY INSPECTION REPORT

FACILITY NAME: Doswell WTP		**INSPECTION DATE:**	March 10, 2009
		INSPECTOR	Mike Dare
PERMIT No.: VA0025569		**REPORT DATE:**	March 16, 2009
TYPE OF FACILITY: ☐ Municipal ☑ Small Minor ☑ Industrial ☐ Federal		**TIME OF INSPECTION:**	Arrival 1100 hrs / Departure 1230 hrs
		TOTAL TIME SPENT (including prep & travel)	8 hours
PHOTOGRAPHS: ☑ Yes ☐ No		**UNANNOUNCED INSPECTION?**	☑ Yes ☐ No
REVIEWED BY / Date:			
PRESENT DURING INSPECTION: Jonathan England			

TECHNICAL INSPECTION

1. Has there been any new construction? • If so, were plans and specifications approved? Comments:	☐ Yes ☑ No
2. Is the Operations and Maintenance Manual approved and up-to-date? Comments: **On hand, approved 6/15/99 – some minor changes reportedly required**	☐ Yes ☑ No
3. Are the Permit and/or Operation and Maintenance Manual specified licensed operator being met? Comments: **No licensed Operator requirement. (2 class IV Operators on staff.)**	☑ Yes ☐ No
4. Are the Permit and/or Operation and Maintenance Manual specified operator staffing requirements being met? Comments: **Facility is staffed by 1 Superintendent and 9 Operators**	☑ Yes ☐ No
5. Is there an established and adequate program for training personnel? Comments: **OJT**	☑ Yes ☐ No
6. Are preventive maintenance task schedules being met? Comments: **Minimal PM is necessary with this wastewater system**	☑ Yes ☐ No
7. Does the plant experience any organic or hydraulic overloading? Comments:	☐ Yes ☑ No
8. Has there been any bypassing or overflows since the last inspection? Comments:	☐ Yes ☑ No
9. Is the standby generator (including power transfer switch) operational and exercised regularly? Comments: **N/A; The wastewater system does not require emergency power. There is an emergency generator for the water treatment plant.**	☐ Yes ☐ No
10. Is the plant alarm system operational and tested regularly? Comments: **N/A; The wastewater system has no alarms.**	☐ Yes ☐ No

VA DEQ Wastewater Facility Inspection Report

Permit #	VA0025569

TECHNICAL INSPECTION

11. Is sludge disposed of in accordance with the approved sludge management plan? Comments: **It is anticipated that sludge will be removed from the Borrow Pit during the Summer of 2009 for landfill disposal**	☑ Yes ☐ No
12. Is septage received? • If so, is septage loading controlled, and are appropriate records maintained? Comments:	☐ Yes ☑ No
13. Are all plant records (operational logs, equipment maintenance, industrial waste contributors, sampling and testing) available for review and are records adequate? Comments:	☑ Yes ☐ No

14. Which of the following records does the plant maintain?

☑ Operational logs ☐ Instrument maintenance & calibration

☐ Mechanical equipment maintenance ☐ Industrial Waste Contribution (Municipal facilities)

Comments:

15. What does the operational log contain?

☑ Visual observations ☑ Flow Measurement ☑ Laboratory results ☐ Process adjustments

☐ Control calculations ☐ Other (specify)

Comments:

16. What do the mechanical equipment records contain?

☑ As built plans and specs ☐ Manufacturers instructions ☐ Lubrication schedules

☑ Spare parts inventory ☐ Equipment/parts suppliers

☐ Other (specify)

Comments: **A very limited supply of spare parts is required for the wastewater system**

17. What do the industrial waste contribution records contain (Municipal only)?

☐ Waste characteristics ☐ Impact on plant ☐ Locations and discharge types

☐ Other (specify)

Comments: **N/A**

18. Which of the following records are kept at the plant and available to personnel?

☑ Equipment maintenance records ☑ Operational log ☐ Industrial contributor records

☐ Instrumentation records ☑ Sampling and testing records

Comments:

19. List records not normally available to plant personnel and their location:

Comments: **N/A**

20. Are the records maintained for the required time period (three or five years)? Comments:	☑ Yes ☐ No

VA DEQ Wastewater Facility Inspection Report

Permit #	VA0025569

UNIT PROCESS EVALUATION SUMMARY SHEET

UNIT PROCESS	APPLICABLE	PROBLEMS*	COMMENTS
Sewage Pumping			
Flow Measurement (Influent)			
Screening/Comminution			
Grit Removal			
Oil/Water Separator	**Yes**		*Cleaned annually by Safety-Kleen*
Flow Equalization			
Ponds/Lagoons	**Yes**		*Two lagoons*
Imhoff Tank			
Primary Sedimentation			
Trickling Filter			
Septic Tank and Sand Filter			
Rotating Biological Contactor			
Activated Sludge Aeration			
Biological Nutrient Removal			
Sequencing Batch Reactor			
Secondary Sedimentation			
Flocculation			
Tertiary Sedimentation			
Filtration			
Micro-Screening			
Activated Carbon Adsorption			
Chlorination			
Dechlorination			
Ozonation			
Ultraviolet Disinfection			
Post Aeration			
Flow Measurement (Effluent)	**Yes**		*Pressure sensing flow meter is attached to Palmer-Bowlus flume*
Land Application (Effluent)			
Plant Outfall	**Yes**		*Shore based at North Anna River*
Sludge Pumping			
Flotation Thickening (DAF)			
Gravity Thickening			
Aerobic Digestion			
Anaerobic Digestion			
Lime Stabilization			
Centrifugation			
Sludge Press			
Vacuum Filtration			
Drying Beds	**Yes**		*Borrow Pit*
Thermal Treatment			
Incineration			
Composting			
Land Application (Sludge)			

* Problem Codes

1. Unit Needs Attention
2. Abnormal Influent/Effluent
3. Evidence of Equipment Failure
4. Unapproved Modification or Temporary Repair
5. Evidence of Process Upset
6. Other (explain in comments)

INSPECTION OVERVIEW AND CONDITION OF TREATMENT UNITS

The waste stream from this water treatment plant consists of filter backwash water, sediment basin sediment and flow from lab spigots, building floor drains and the diesel AST containment drain. The waste stream flows directly to the lagoons, except for rainwater released from the AST containment which first flows through an oil-water separator. Sludge in the lagoons is removed to the borrow pit on an annual basis.

Lagoons (2): A large earthen basin is divided in half by a concrete barrier to form the two lagoons. The waste stream from the plant is directed to one lagoon at a time. This prevents contamination of both lagoons in the event of a fuel, chemical or other unusual discharge. Each lagoon has its own discharge structure. The lagoons discharge through an underground pipe to the North Anna River. The groundwater monitoring requirement, suspended for the remainder of the current permit, may be reinstated when the permit is reissued later this year.

Borrow Pit: Once a year, sludge from the lagoons is removed to the borrow pit. Water in the sludge evaporates or drains through a French drain system to a sump. From the sump, water is pumped to a smaller pit. Sludge has been deposited in the borrow pit over the past five years without removal. It is anticipated that the sludge will be removed to a landfill during the summer of 2009.

Oil-water separator: Rain water that is drained from the diesel AST containment, flows through an oil-water separator prior to entering the lagoon. The oil-water separator is cleaned annually by Safety-Kleen.

Flow Meter: An 8" Palmer-Bowlus Flume is located in a manhole on the discharge pipe mid-way between the lagoons and the North Anna River. To obtain a flow reading, an Operator attaches a portable digital pressure meter to a piece of tubing that is tied into the Flume. Data indicating the meter was calibrated within the past 12 months was unavailable at the time of inspection.

An Operator attaches a portable digital pressure meter to tubing that is tied into the Flume.

Outfall: The outfall is located approximately 100' downstream of the facility's water intake structure on the North Anna River. Rip-rap has been placed at this shore based point of discharge. There was no discharge at the time of inspection. No impact on the receiving stream was noted.

VA DEQ Wastewater Facility Inspection Report

Permit #	VA0025569

EFFLUENT FIELD DATA: No discharge at time of inspection

Flow	MGD	**Dissolved Oxygen**	mg/L	**TRC (Contact Tank)**	mg/L
pH	S.U.	**Temperature**	°C	**TRC (Final Effluent)**	mg/L

Was a Sampling Inspection conducted? ☐ Yes (see Sampling Inspection Report) ☑ No

CONDITION OF OUTFALL AND EFFLUENT CHARACTERISTICS:

1. Type of outfall: ☑ Shore based ☐ Submerged Diffuser? ☐ Yes ☑ No
2. Are the outfall and supporting structures in good condition? ☑ Yes ☐ No
3. Final Effluent (evidence of following problems): ☐ Sludge bar ☐ Grease ☐ Turbid effluent ☐ Visible foam ☐ Unusual color ☐ Oil sheen
4. Is there a visible effluent plume in the receiving stream? ☐ Yes ☐ No
5. Receiving stream: ☑ No observed problems ☐ Indication of problems (explain below)

Comments: **No discharge at time of inspection**

REQUIRED CORRECTIVE ACTIONS:

1. It was reported that the O&M manual requires minor changes in order for it to be considered up-to-date. Please make the appropriate changes to the manual.
2. The portable digital effluent flow meter has not been calibrated within the past year. This meter should be calibrated annually.

NOTES and COMMENTS:

None

Attachment 6

Effluent Data from Discharge Monitoring Reports (including monitoring frequency analysis)

Attachment 6

Effluent Data

Effluent Data from Discharge Monitoring Reports

All samling frequencies are once per month. Therefore, the flow listed below was reported as both the monthly average and the daily maximum; the reported pH is both the minimum and the maximum; and the TSS concentration is both the monthly average and the daily maximum.

Date	Flow, MGD	pH, SU	TSS, mg/L
2006			
August	0.0525	6.9	2.3
September	0.0777	6.85	8.8
October	0.0645	7.02	1.8
November	0.1758	6.51	1.2
December	0.1550	6.54	1.7
2007			
January	0.0358	6.81	4.3
February	0.1445	6.98	1.6
March	0.2083	6.86	2.6
April	0.0848	6.90	4.6
May	0.1348	6.70	2.3
June	0.1167	6.88	3.8
July	0.1167	6.50	2.2
August	0.1167	6.88	1.3
September	0.1860	6.75	1.9
October	0.1545	7.14	1.5
November	0.1000	6.70	3.2
December	0.1255	6.90	2.4
2008			
January	0.1202	6.80	1.8
February	0.3875	6.89	1.9
March	0.1545	7.00	3.6
April	0.1358	7.20	1.4
May	0.0922	6.98	2.0
June	0.2083	7.01	2.1
July	0.1000	7.15	1.5
August	0.0997	7.07	2.1
September	0.1296	6.86	4.0
October	0.0238	7.00	2.2
November	0.0198	6.70	2.4
December	0.0198	6.75	0.7
2009			
January	0.0840	6.72	2.0
February	0.0583	6.80	1.5
March	0.0583	6.90	1.6
April	0.1167	7.34	5.7

Date	Flow, MGD	pH, SU	TSS, mg/L
May	0.2360	6.97	3.9
June	0.1445	6.70	4.5
July	0.1167	6.75	3.6
Average value	0.1210	6.87	2.7
Maximum value	0.3875	7.34	8.8
Minimum value	0.0198	6.50	0.7
	90th percentile	7.11	
	10th percentile	6.70	
Monthly Average Effluent Limitations (mg/L):			30
Effluent Limitations (SU):		6.0 / 9.0	
Ratio of actual average (min/max for pH) to monthly average limitation (min/max for pH):		64% *	9%
Current Monitoring Frequency:		1 / Month	1 / Month
Baseline Monitoring:		1 / Month	1 / Month
Monitoring frequency can be reduced from baseline to:		1 / Month*	1 / 6 Months

* The pH percentages are determined as follows: The minimum reported pH of 6.5 SU is 0.5 SU from the minimum limitation of 6.0. The pH range is 3 SU. Therefore, the minimum reported value is 0.5 ÷ 3.0 = 0.17, or 17%, of the range away from the limitation of 6.0 SU. As actual pH values closer to the limitation of 6.0 represent "poorer" performance, the relationship of the actual value to the limitation then becomes 100 - 17 = 83%. Likewise the maximum value of 7.34 is 1.66 SU from the maximum limitation. 1.66 ÷ 3.0 = 0.55 (55%); 100 - 55 = 45%. The sampling frequency of 1 / Month is based on the average -- 64% -- of those two percentages.

Attachment 7

Evaluation of Water Quality-Based Effluent Limitations (MIX, MSTRANTI, and STATS printouts)

Mixing Zone Predictions for Doswell Water Treatment Plant

Effluent Flow = 0.3875 MGD
Stream 7Q10 = 25 MGD
Stream 30Q10 = 27 MGD
Stream 1Q10 = 23 MGD
Stream slope = 0.00038 ft/ft
Stream width = 75 ft
Bottom scale = 2
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 1.2629 ft
Length = 5947.03 ft
Velocity = .4149 ft/sec
Residence Time = .1659 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = 1.3224 ft
Length = 5717.06 ft
Velocity = .4274 ft/sec
Residence Time = .1548 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = 1.2014 ft
Length = 6205.9 ft
Velocity = .4018 ft/sec
Residence Time = 4.2905 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 23.31% of the 1Q10 is used.

Virginia DEQ Mixing Zone Analysis Version 2.1

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Doswell Water Treatment Plant Permit No.: VA0025569

Receiving Stream: North Anna River Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	19	mg/L
90% Temperature (Annual) =	25.9	deg C
90% Temperature (Wet season) =		deg C
90% Maximum pH =	7.4	SU
10% Maximum pH =	6.4	SU
Tier Designation (1 or 2) =	2	
Public Water Supply (PWS) Y/N? =	n	
Trout Present Y/N? =	n	
Early Life Stages Present Y/N? =	y	

Stream Flows

1Q10 (Annual) =	23	MGD
7Q10 (Annual) =	25	MGD
30Q10 (Annual) =	27	MGD
1Q10 (Wet season) =		MGD
30Q10 (Wet season) =		MGD
30Q5 =	28	MGD
Harmonic Mean =	72	MGD
Annual Average =		MGD

Mixing Information

Annual - 1Q10 Mix =	23.31	%
- 7Q10 Mix =	100	%
- 30Q10 Mix =	100	%
Wet Season - 1Q10 Mix =		%
- 30Q10 Mix =		%

Effluent Information

Mean Hardness (as CaCO3) =	25	mg/L
90% Temp (Annual) =	29	deg C
90% Temp (Wet season) =		deg C
90% Maximum pH =	7.11	SU
10% Maximum pH =	6.7	SU
Discharge Flow =	0.3875	MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	2.7E+03	--	--	na	2.0E+05	--	--	na	2.7E+02	--	--	na	2.0E+04	--	--	na	2.0E+04
Acrolein	0	--	--	na	7.8E+02	--	--	na	5.7E+04	--	--	na	7.8E+01	--	--	na	5.7E+03	--	--	na	5.7E+03
Acrylonitrile [C]	0	--	--	na	6.6E+00	--	--	na	1.2E+03	--	--	na	6.6E-01	--	--	na	1.2E+02	--	--	na	1.2E+02
Aldrin [C]	0	3.0E+00	--	na	1.4E-03	4.5E+01	--	na	2.6E-01	7.5E-01	--	na	1.4E-04	4.5E+01	--	na	2.6E-02	4.5E+01	--	na	2.6E-02
Ammonia-N (mg/l) (Yearly)	0	2.38E+01	2.28E+00	na	--	3.5E+02	1.6E+02	na	--	5.80E+00	5.69E-01	na	--	3.5E+02	4.0E+01	na	--	3.5E+02	4.0E+01	na	--
Ammonia-N (mg/l) (High Flow)	0	3.25E+01	5.64E+00	na	--	3.3E+01	5.6E+00	na	--	8.13E+00	1.41E+00	na	--	8.1E+00	1.4E+00	na	--	8.1E+00	1.4E+00	na	--
Anthracene	0	--	--	na	1.1E+05	--	--	na	8.1E+06	--	--	na	1.1E+04	--	--	na	8.1E+05	--	--	na	8.1E+05
Antimony	0	--	--	na	4.3E+03	--	--	na	3.2E+05	--	--	na	4.3E+02	--	--	na	3.2E+04	--	--	na	3.2E+04
Arsenic	0	3.4E+02	1.5E+02	na	--	5.0E+03	9.8E+03	na	--	8.5E+01	3.8E+01	na	--	5.1E+03	2.5E+03	na	--	5.0E+03	2.5E+03	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Benzene [C]	0	--	--	na	7.1E+02	--	--	na	1.3E+05	--	--	na	7.1E+01	--	--	na	1.3E+04	--	--	na	1.3E+04
Benzidine [C]	0	--	--	na	5.4E-03	--	--	na	1.0E+00	--	--	na	5.4E-04	--	--	na	1.0E-01	--	--	na	1.0E-01
Benzo (a) anthracene [C]	0	--	--	na	4.9E-01	--	--	na	9.2E+01	--	--	na	4.9E-02	--	--	na	9.2E+00	--	--	na	9.2E+00
Benzo (b) fluoranthene [C]	0	--	--	na	4.9E-01	--	--	na	9.2E+01	--	--	na	4.9E-02	--	--	na	9.2E+00	--	--	na	9.2E+00
Benzo (k) fluoranthene [C]	0	--	--	na	4.9E-01	--	--	na	9.2E+01	--	--	na	4.9E-02	--	--	na	9.2E+00	--	--	na	9.2E+00
Benzo (a) pyrene [C]	0	--	--	na	4.9E-01	--	--	na	9.2E+01	--	--	na	4.9E-02	--	--	na	9.2E+00	--	--	na	9.2E+00
Bis2-Chloroethyl Ether	0	--	--	na	1.4E+01	--	--	na	1.0E+03	--	--	na	1.4E+00	--	--	na	1.0E+02	--	--	na	1.0E+02
Bis2-Chloroisopropyl Ether	0	--	--	na	1.7E+05	--	--	na	1.2E+07	--	--	na	1.7E+04	--	--	na	1.2E+06	--	--	na	1.2E+06
Bromoform [C]	0	--	--	na	3.6E+03	--	--	na	6.7E+05	--	--	na	3.6E+02	--	--	na	6.7E+04	--	--	na	6.7E+04
Butylbenzylphthalate	0	--	--	na	5.2E+03	--	--	na	3.8E+05	--	--	na	5.2E+02	--	--	na	3.8E+04	--	--	na	3.8E+04
Cadmium	0	8.2E-01	3.8E-01	na	--	1.2E+01	2.5E+01	na	--	2.1E-01	9.5E-02	na	--	1.2E+01	6.3E+00	na	--	1.2E+01	6.3E+00	na	--
Carbon Tetrachloride [C]	0	--	--	na	4.4E+01	--	--	na	8.2E+03	--	--	na	4.4E+00	--	--	na	8.2E+02	--	--	na	8.2E+02
Chlordane [C]	0	2.4E+00	4.3E-03	na	2.2E-02	3.6E+01	2.8E-01	na	4.1E+00	6.0E-01	1.1E-03	na	2.2E-03	3.6E+01	7.0E-02	na	4.1E-01	3.6E+01	7.0E-02	na	4.1E-01
Chloride	0	8.6E+05	2.3E+05	na	--	1.3E+07	1.5E+07	na	--	2.2E+05	5.8E+04	na	--	1.3E+07	3.8E+06	na	--	1.3E+07	3.8E+06	na	--
TRC	0	1.9E+01	1.1E+01	na	--	2.8E+02	7.2E+02	na	--	4.8E+00	2.8E+00	na	--	2.9E+02	1.8E+02	na	--	2.8E+02	1.8E+02	na	--
Chlorobenzene	0	--	--	na	2.1E+04	--	--	na	1.5E+06	--	--	na	2.1E+03	--	--	na	1.5E+05	--	--	na	1.5E+05

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane [C]	0	--	--	na	3.4E+02	--	--	na	6.4E+04	--	--	na	3.4E+01	--	--	na	6.4E+03	--	--	na	6.4E+03
Chloroform [C]	0	--	--	na	2.9E+04	--	--	na	5.4E+06	--	--	na	2.9E+03	--	--	na	5.4E+05	--	--	na	5.4E+05
2-Chloronaphthalene	0	--	--	na	4.3E+03	--	--	na	3.2E+05	--	--	na	4.3E+02	--	--	na	3.2E+04	--	--	na	3.2E+04
2-Chlorophenol	0	--	--	na	4.0E+02	--	--	na	2.9E+04	--	--	na	4.0E+01	--	--	na	2.9E+03	--	--	na	2.9E+03
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.2E+00	2.7E+00	na	--	2.1E-02	1.0E-02	na	--	1.3E+00	6.7E-01	na	--	1.2E+00	6.7E-01	na	--
Chromium III	0	1.8E+02	2.4E+01	na	--	2.7E+03	1.6E+03	na	--	4.6E+01	6.0E+00	na	--	2.8E+03	3.9E+02	na	--	2.7E+03	3.9E+02	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	2.4E+02	7.2E+02	na	--	4.0E+00	2.8E+00	na	--	2.4E+02	1.8E+02	na	--	2.4E+02	1.8E+02	na	--
Chromium, Total	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Chrysene [C]	0	--	--	na	4.9E-01	--	--	na	9.2E+01	--	--	na	4.9E-02	--	--	na	9.2E+00	--	--	na	9.2E+00
Copper	0	3.6E+00	2.7E+00	na	--	5.4E+01	1.8E+02	na	--	9.1E-01	6.8E-01	na	--	5.5E+01	4.5E+01	na	--	5.4E+01	4.5E+01	na	--
Cyanide	0	2.2E+01	5.2E+00	na	2.2E+05	3.3E+02	3.4E+02	na	1.6E+07	5.5E+00	1.3E+00	na	2.2E+04	3.3E+02	8.5E+01	na	1.6E+06	3.3E+02	8.5E+01	na	1.6E+06
DDD [C]	0	--	--	na	8.4E-03	--	--	na	1.6E+00	--	--	na	8.4E-04	--	--	na	1.6E-01	--	--	na	1.6E-01
DDE [C]	0	--	--	na	5.9E-03	--	--	na	1.1E+00	--	--	na	5.9E-04	--	--	na	1.1E-01	--	--	na	1.1E-01
DDT [C]	0	1.1E+00	1.0E-03	na	5.9E-03	1.6E+01	6.6E-02	na	1.1E+00	2.8E-01	2.5E-04	na	5.9E-04	1.7E+01	1.6E-02	na	1.1E-01	1.6E+01	1.6E-02	na	1.1E-01
Demeton	0	--	1.0E-01	na	--	--	6.6E+00	na	--	--	2.5E-02	na	--	--	1.6E+00	na	--	--	1.6E+00	na	--
Dibenz(a,h)anthracene [C]	0	--	--	na	4.9E-01	--	--	na	9.2E+01	--	--	na	4.9E-02	--	--	na	9.2E+00	--	--	na	9.2E+00
Dibutyl phthalate	0	--	--	na	1.2E+04	--	--	na	8.8E+05	--	--	na	1.2E+03	--	--	na	8.8E+04	--	--	na	8.8E+04
Dichloromethane (Methylene Chloride) [C]	0	--	--	na	1.6E+04	--	--	na	3.0E+06	--	--	na	1.6E+03	--	--	na	3.0E+05	--	--	na	3.0E+05
1,2-Dichlorobenzene	0	--	--	na	1.7E+04	--	--	na	1.2E+06	--	--	na	1.7E+03	--	--	na	1.2E+05	--	--	na	1.2E+05
1,3-Dichlorobenzene	0	--	--	na	2.6E+03	--	--	na	1.9E+05	--	--	na	2.6E+02	--	--	na	1.9E+04	--	--	na	1.9E+04
1,4-Dichlorobenzene	0	--	--	na	2.6E+03	--	--	na	1.9E+05	--	--	na	2.6E+02	--	--	na	1.9E+04	--	--	na	1.9E+04
3,3-Dichlorobenzidine [C]	0	--	--	na	7.7E-01	--	--	na	1.4E+02	--	--	na	7.7E-02	--	--	na	1.4E+01	--	--	na	1.4E+01
Dichlorobromomethane [C]	0	--	--	na	4.6E+02	--	--	na	8.6E+04	--	--	na	4.6E+01	--	--	na	8.6E+03	--	--	na	8.6E+03
1,2-Dichloroethane [C]	0	--	--	na	9.9E+02	--	--	na	1.8E+05	--	--	na	9.9E+01	--	--	na	1.8E+04	--	--	na	1.8E+04
1,1-Dichloroethylene	0	--	--	na	1.7E+04	--	--	na	1.2E+06	--	--	na	1.7E+03	--	--	na	1.2E+05	--	--	na	1.2E+05
1,2-trans-dichloroethylene	0	--	--	na	1.4E+05	--	--	na	1.0E+07	--	--	na	1.4E+04	--	--	na	1.0E+06	--	--	na	1.0E+06
2,4-Dichlorophenol	0	--	--	na	7.9E+02	--	--	na	5.8E+04	--	--	na	7.9E+01	--	--	na	5.8E+03	--	--	na	5.8E+03
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
1,2-Dichloropropane [C]	0	--	--	na	3.9E+02	--	--	na	7.3E+04	--	--	na	3.9E+01	--	--	na	7.3E+03	--	--	na	7.3E+03
1,3-Dichloropropene	0	--	--	na	1.7E+03	--	--	na	1.2E+05	--	--	na	1.7E+02	--	--	na	1.2E+04	--	--	na	1.2E+04
Dieldrin [C]	0	2.4E-01	5.6E-02	na	1.4E-03	3.6E+00	3.7E+00	na	2.6E-01	6.0E-02	1.4E-02	na	1.4E-04	3.6E+00	9.2E-01	na	2.6E-02	3.6E+00	9.2E-01	na	2.6E-02
Diethyl Phthalate	0	--	--	na	1.2E+05	--	--	na	8.8E+06	--	--	na	1.2E+04	--	--	na	8.8E+05	--	--	na	8.8E+05
Di-2-Ethylhexyl Phthalate [C]	0	--	--	na	5.9E+01	--	--	na	1.1E+04	--	--	na	5.9E+00	--	--	na	1.1E+03	--	--	na	1.1E+03
2,4-Dimethylphenol	0	--	--	na	2.3E+03	--	--	na	1.7E+05	--	--	na	2.3E+02	--	--	na	1.7E+04	--	--	na	1.7E+04
Dimethyl Phthalate	0	--	--	na	2.9E+06	--	--	na	2.1E+08	--	--	na	2.9E+05	--	--	na	2.1E+07	--	--	na	2.1E+07
Di-n-Butyl Phthalate	0	--	--	na	1.2E+04	--	--	na	8.8E+05	--	--	na	1.2E+03	--	--	na	8.8E+04	--	--	na	8.8E+04
2,4 Dinitrophenol	0	--	--	na	1.4E+04	--	--	na	1.0E+06	--	--	na	1.4E+03	--	--	na	1.0E+05	--	--	na	1.0E+05
2-Methyl-4,6-Dinitrophenol	0	--	--	na	7.65E+02	--	--	na	5.6E+04	--	--	na	7.7E+01	--	--	na	5.6E+03	--	--	na	5.6E+03
2,4-Dinitrotoluene [C]	0	--	--	na	9.1E+01	--	--	na	1.7E+04	--	--	na	9.1E+00	--	--	na	1.7E+03	--	--	na	1.7E+03
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin) (ppq)	0	--	--	na	1.2E-06	--	--	na	na	--	--	na	1.2E-07	--	--	na	1.2E-07	--	--	na	na
1,2-Diphenylhydrazine [C]	0	--	--	na	5.4E+00	--	--	na	1.0E+03	--	--	na	5.4E-01	--	--	na	1.0E+02	--	--	na	1.0E+02
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	3.3E+00	3.7E+00	na	1.8E+04	5.5E-02	1.4E-02	na	2.4E+01	3.3E+00	9.2E-01	na	1.8E+03	3.3E+00	9.2E-01	na	1.8E+03
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	3.3E+00	3.7E+00	na	1.8E+04	5.5E-02	1.4E-02	na	2.4E+01	3.3E+00	9.2E-01	na	1.8E+03	3.3E+00	9.2E-01	na	1.8E+03
Endosulfan Sulfate	0	--	--	na	2.4E+02	--	--	na	1.8E+04	--	--	na	2.4E+01	--	--	na	1.8E+03	--	--	na	1.8E+03
Endrin	0	8.6E-02	3.6E-02	na	8.1E-01	1.3E+00	2.4E+00	na	5.9E+01	2.2E-02	9.0E-03	na	8.1E-02	1.3E+00	5.9E-01	na	5.9E+00	1.3E+00	5.9E-01	na	5.9E+00
Endrin Aldehyde	0	--	--	na	8.1E-01	--	--	na	5.9E+01	--	--	na	8.1E-02	--	--	na	5.9E+00	--	--	na	5.9E+00

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.9E+04	--	--	na	2.1E+06	--	--	na	2.9E+03	--	--	na	2.1E+05	--	--	na	2.1E+05
Fluoranthene	0	--	--	na	3.7E+02	--	--	na	2.7E+04	--	--	na	3.7E+01	--	--	na	2.7E+03	--	--	na	2.7E+03
Fluorene	0	--	--	na	1.4E+04	--	--	na	1.0E+06	--	--	na	1.4E+03	--	--	na	1.0E+05	--	--	na	1.0E+05
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	6.6E-01	na	--	--	2.5E-03	na	--	--	1.6E-01	na	--	--	1.6E-01	na	--
Heptachlor [C]	0	5.2E-01	3.8E-03	na	2.1E-03	7.7E+00	2.5E-01	na	3.9E-01	1.3E-01	9.5E-04	na	2.1E-04	7.8E+00	6.2E-02	na	3.9E-02	7.7E+00	6.2E-02	na	3.9E-02
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	1.1E-03	7.7E+00	2.5E-01	na	2.1E-01	1.3E-01	9.5E-04	na	1.1E-04	7.8E+00	6.2E-02	na	2.1E-02	7.7E+00	6.2E-02	na	2.1E-02
Hexachlorobenzene[C]	0	--	--	na	7.7E-03	--	--	na	1.4E+00	--	--	na	7.7E-04	--	--	na	1.4E-01	--	--	na	1.4E-01
Hexachlorobutadiene[C]	0	--	--	na	5.0E+02	--	--	na	9.3E+04	--	--	na	5.0E+01	--	--	na	9.3E+03	--	--	na	9.3E+03
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	1.3E-01	--	--	na	2.4E+01	--	--	na	1.3E-02	--	--	na	2.4E+00	--	--	na	2.4E+00
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	4.6E-01	--	--	na	8.6E+01	--	--	na	4.6E-02	--	--	na	8.6E+00	--	--	na	8.6E+00
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	6.3E-01	1.4E+01	--	na	1.2E+02	2.4E-01	--	na	6.3E-02	1.4E+01	--	na	1.2E+01	1.4E+01	--	na	1.2E+01
Hexachlorocyclopentadiene	0	--	--	na	1.7E+04	--	--	na	1.2E+06	--	--	na	1.7E+03	--	--	na	1.2E+05	--	--	na	1.2E+05
Hexachloroethane[C]	0	--	--	na	8.9E+01	--	--	na	1.7E+04	--	--	na	8.9E+00	--	--	na	1.7E+03	--	--	na	1.7E+03
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	1.3E+02	na	--	--	5.0E-01	na	--	--	3.3E+01	na	--	--	3.3E+01	na	--
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	4.9E-01	--	--	na	9.2E+01	--	--	na	4.9E-02	--	--	na	9.2E+00	--	--	na	9.2E+00
Iron	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Isophorone[C]	0	--	--	na	2.6E+04	--	--	na	4.9E+06	--	--	na	2.6E+03	--	--	na	4.9E+05	--	--	na	4.9E+05
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--
Lead	0	2.0E+01	2.3E+00	na	--	3.0E+02	1.5E+02	na	--	5.1E+00	5.8E-01	na	--	3.1E+02	3.8E+01	na	--	3.0E+02	3.8E+01	na	--
Malathion	0	--	1.0E-01	na	--	--	6.6E+00	na	--	--	2.5E-02	na	--	--	1.6E+00	na	--	--	1.6E+00	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	na	5.1E-02	2.1E+01	5.0E+01	na	3.7E+00	3.5E-01	1.9E-01	na	5.1E-03	2.1E+01	1.3E+01	na	3.7E-01	2.1E+01	1.3E+01	na	3.7E-01
Methyl Bromide	0	--	--	na	4.0E+03	--	--	na	2.9E+05	--	--	na	4.0E+02	--	--	na	2.9E+04	--	--	na	2.9E+04
Methoxychlor	0	--	3.0E-02	na	--	--	2.0E+00	na	--	--	7.5E-03	na	--	--	4.9E-01	na	--	--	4.9E-01	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--
Monochlorobenzene	0	--	--	na	2.1E+04	--	--	na	1.5E+06	--	--	na	2.1E+03	--	--	na	1.5E+05	--	--	na	1.5E+05
Nickel	0	5.6E+01	6.3E+00	na	4.6E+03	8.4E+02	4.1E+02	na	3.4E+05	1.4E+01	1.6E+00	na	4.6E+02	8.5E+02	1.0E+02	na	3.4E+04	8.4E+02	1.0E+02	na	3.4E+04
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Nitrobenzene	0	--	--	na	1.9E+03	--	--	na	1.4E+05	--	--	na	1.9E+02	--	--	na	1.4E+04	--	--	na	1.4E+04
N-Nitrosodimethylamine[C]	0	--	--	na	8.1E+01	--	--	na	1.5E+04	--	--	na	8.1E+00	--	--	na	1.5E+03	--	--	na	1.5E+03
N-Nitrosodiphenylamine[C]	0	--	--	na	1.6E+02	--	--	na	3.0E+04	--	--	na	1.6E+01	--	--	na	3.0E+03	--	--	na	3.0E+03
N-Nitrosodi-n-propylamine[C]	0	--	--	na	1.4E+01	--	--	na	2.6E+03	--	--	na	1.4E+00	--	--	na	2.6E+02	--	--	na	2.6E+02
Parathion	0	6.5E-02	1.3E-02	na	--	9.6E-01	8.5E-01	na	--	1.6E-02	3.3E-03	na	--	9.8E-01	2.1E-01	na	--	9.6E-01	2.1E-01	na	--
PCB-1016	0	--	1.4E-02	na	--	--	9.2E-01	na	--	--	3.5E-03	na	--	--	2.3E-01	na	--	--	2.3E-01	na	--
PCB-1221	0	--	1.4E-02	na	--	--	9.2E-01	na	--	--	3.5E-03	na	--	--	2.3E-01	na	--	--	2.3E-01	na	--
PCB-1232	0	--	1.4E-02	na	--	--	9.2E-01	na	--	--	3.5E-03	na	--	--	2.3E-01	na	--	--	2.3E-01	na	--
PCB-1242	0	--	1.4E-02	na	--	--	9.2E-01	na	--	--	3.5E-03	na	--	--	2.3E-01	na	--	--	2.3E-01	na	--
PCB-1248	0	--	1.4E-02	na	--	--	9.2E-01	na	--	--	3.5E-03	na	--	--	2.3E-01	na	--	--	2.3E-01	na	--
PCB-1254	0	--	1.4E-02	na	--	--	9.2E-01	na	--	--	3.5E-03	na	--	--	2.3E-01	na	--	--	2.3E-01	na	--
PCB-1260	0	--	1.4E-02	na	--	--	9.2E-01	na	--	--	3.5E-03	na	--	--	2.3E-01	na	--	--	2.3E-01	na	--
PCB Total[C]	0	--	--	na	1.7E-03	--	--	na	3.2E-01	--	--	na	1.7E-04	--	--	na	3.2E-02	--	--	na	3.2E-02

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Pentachlorophenol [C]	0	4.8E+00	3.7E+00	na	8.2E+01	7.2E+01	2.4E+02	na	1.5E+04	1.2E+00	9.2E-01	na	8.2E+00	7.2E+01	6.0E+01	na	1.5E+03	**7.2E+01**	**6.0E+01**	na	**1.5E+03**
Phenol	0	--	--	na	4.6E+06	--	--	na	3.4E+08	--	--	na	4.6E+05	--	--	na	3.4E+07	--	--	na	**3.4E+07**
Pyrene	0	--	--	na	1.1E+04	--	--	na	8.1E+05	--	--	na	1.1E+03	--	--	na	8.1E+04	--	--	na	**8.1E+04**
Radionuclides (pCi/l except Beta/Photon)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Gross Alpha Activity Beta and Photon Activity (mrem/yr)	0	--	--	na	1.5E+01	--	--	na	1.1E+03	--	--	na	1.5E+00	--	--	na	1.1E+02	--	--	na	**1.1E+02**
Strontium-90	0	--	--	na	4.0E+00	--	--	na	2.9E+02	--	--	na	4.0E-01	--	--	na	2.9E+01	--	--	na	**2.9E+01**
Tritium	0	--	--	na	8.0E+00	--	--	na	5.9E+02	--	--	na	8.0E-01	--	--	na	5.9E+01	--	--	na	**5.9E+01**
Selenium	0	2.0E+01	5.0E+00	na	2.0E+04	--	--	na	1.5E+06	--	--	na	2.0E+03	--	--	na	1.5E+05	--	--	na	**1.5E+05**
Silver	0	3.2E-01	--	na	1.1E+04	3.0E+02	3.3E+02	na	8.1E+05	5.0E+00	1.3E+00	na	1.1E+03	3.0E+02	8.2E+01	na	8.1E+04	**3.0E+02**	**8.2E+01**	na	**8.1E+04**
Sulfate	0	--	--	na	--	4.7E+00	--	na	--	7.9E-02	--	na	--	4.8E+00	--	na	--	**4.7E+00**	--	na	--
1,1,2,2-Tetrachloroethane [C]	0	--	--	na	1.1E+02	--	--	na	2.1E+04	--	--	na	1.1E+01	--	--	na	2.1E+03	--	--	na	**2.1E+03**
Tetrachloroethylene [C]	0	--	--	na	8.9E+01	--	--	na	1.7E+04	--	--	na	8.9E+00	--	--	na	1.7E+03	--	--	na	**1.7E+03**
Thallium	0	--	--	na	6.3E+00	--	--	na	4.6E+02	--	--	na	6.3E-01	--	--	na	4.6E+01	--	--	na	**4.6E+01**
Toluene	0	--	--	na	2.0E+05	--	--	na	1.5E+07	--	--	na	2.0E+04	--	--	na	1.5E+06	--	--	na	**1.5E+06**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Toxaphene [C]	0	7.3E-01	2.0E-04	na	7.5E-03	1.1E+01	1.3E-02	na	1.4E+00	1.8E-01	5.0E-05	na	7.5E-04	1.1E+01	3.3E-03	na	1.4E-01	**1.1E+01**	**3.3E-03**	na	**1.4E-01**
Tributyltin	0	4.6E-01	6.3E-02	na	--	6.8E+00	4.1E+00	na	--	1.2E-01	1.6E-02	na	--	6.9E+00	1.0E+00	na	--	**6.8E+00**	**1.0E+00**	na	--
1,2,4-Trichlorobenzene	0	--	--	na	9.4E+02	--	--	na	6.9E+04	--	--	na	9.4E+01	--	--	na	6.9E+03	--	--	na	**6.9E+03**
1,1,2-Trichloroethane [C]	0	--	--	na	4.2E+02	--	--	na	7.8E+04	--	--	na	4.2E+01	--	--	na	7.8E+03	--	--	na	**7.8E+03**
Trichloroethylene [C]	0	--	--	na	8.1E+02	--	--	na	1.5E+05	--	--	na	8.1E+01	--	--	na	1.5E+04	--	--	na	**1.5E+04**
2,4,6-Trichlorophenol [C]	0	--	--	na	6.5E+01	--	--	na	1.2E+04	--	--	na	6.5E+00	--	--	na	1.2E+03	--	--	na	**1.2E+03**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Vinyl Chloride [C]	0	--	--	na	6.1E+01	--	--	na	1.1E+04	--	--	na	6.1E+00	--	--	na	1.1E+03	--	--	na	**1.1E+03**
Zinc	0	3.6E+01	3.6E+01	na	6.9E+04	5.4E+02	2.4E+03	na	5.1E+06	9.1E+00	9.1E+00	na	6.9E+03	5.5E+02	6.0E+02	na	5.1E+05	**5.4E+02**	**6.0E+02**	na	**5.1E+05**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens,
   Harmonic Mean for Carcinogens, and Annual Average for Dioxin. Mixing ratios may be substituted for stream flows where appropriate.

Metal	Target Value (SSTV)
Antimony	3.2E+04
Arsenic	1.5E+03
Barium	na
Cadmium	3.8E+00
Chromium III	2.3E+02
Chromium VI	9.5E+01
Copper	2.2E+01
Iron	na
Lead	2.3E+01
Manganese	na
Mercury	3.7E-01
Nickel	6.2E+01
Selenium	4.9E+01
Silver	1.9E+00
Zinc	2.1E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Facility = Doswell Water Treatment Plant
Chemical = Ammonia
Chronic averaging period = 30
WLAa = 350 mg/L
WLAc = 40 mg/L
Q.L. = .2
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = .26
Variance = .024336
C.V. = 0.6
97th percentile daily values = .632688
97th percentile 4 day average = .432585
97th percentile 30 day average = .313573
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

0.26 mg/L

Facility = Doswell Water Treatment Plant
Chemical = Total Residual Chlorine
Chronic averaging period = 4
WLAa = 280 µg/L
WLAc = 180 µg/L
Q.L. = 100
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 20000
Variance = 1440000
C.V. = 0.6
97th percentile daily values = 48668.3
97th percentile 4 day average = 33275.8
97th percentile 30 day average = 24121.0
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity

Maximum Daily Limit = 263.263461129582
Average Weekly Limit = 263.263461129582
Average Monthly Limit = 263.263461129582

The data are:

20000 µg/L

As there is a potential for this discharge to contain chlorine, a limitation is forced using an input concentration of 20,000 µg/L per Guidance Memorandum 00-2011.

The limitation will be expressed in two significant figures as 260 µg/L per Guidance Memorandum 06-2016.

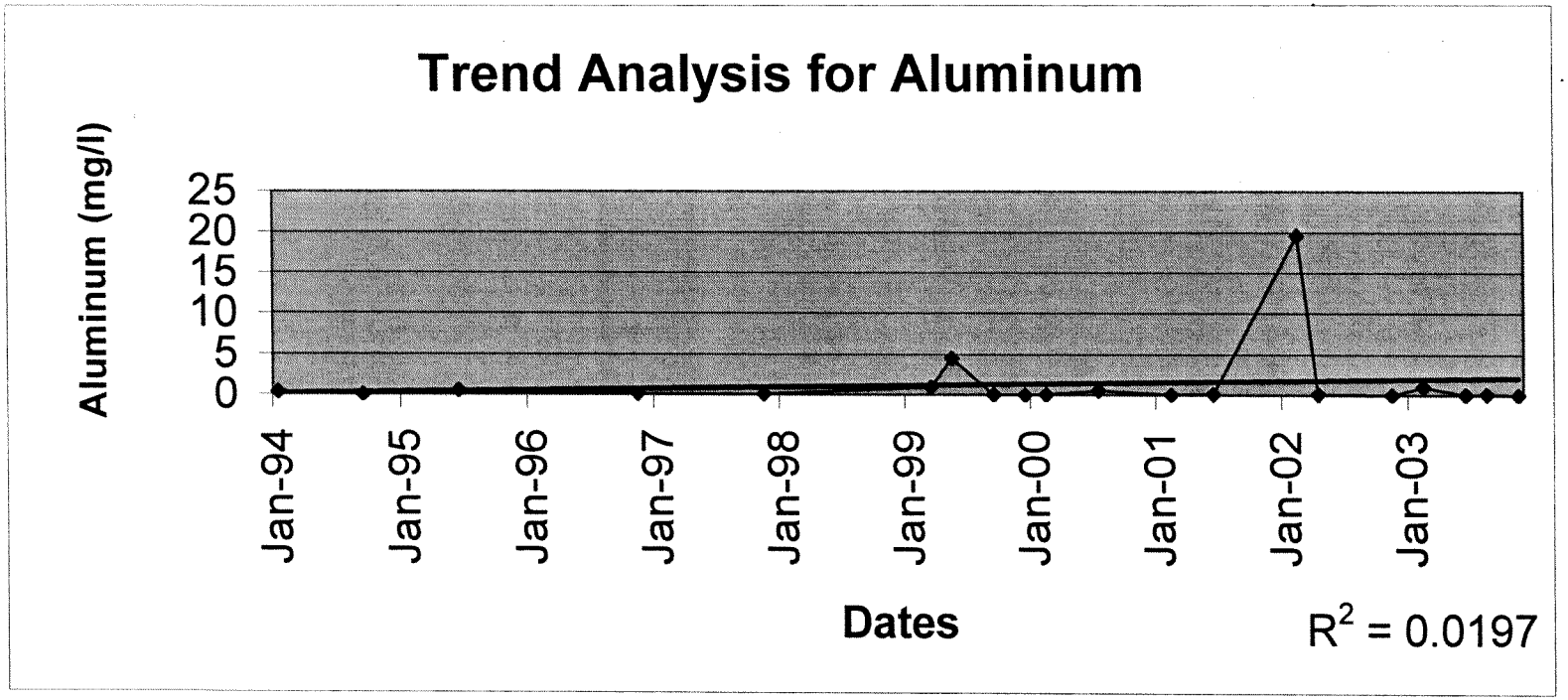
A compliance schedule is not needed because chlorine dissipates in the settling lagoon and, in fact, an effluent concentration of 0.0 mg/L was reported in the permit renewal application.

Attachment 8

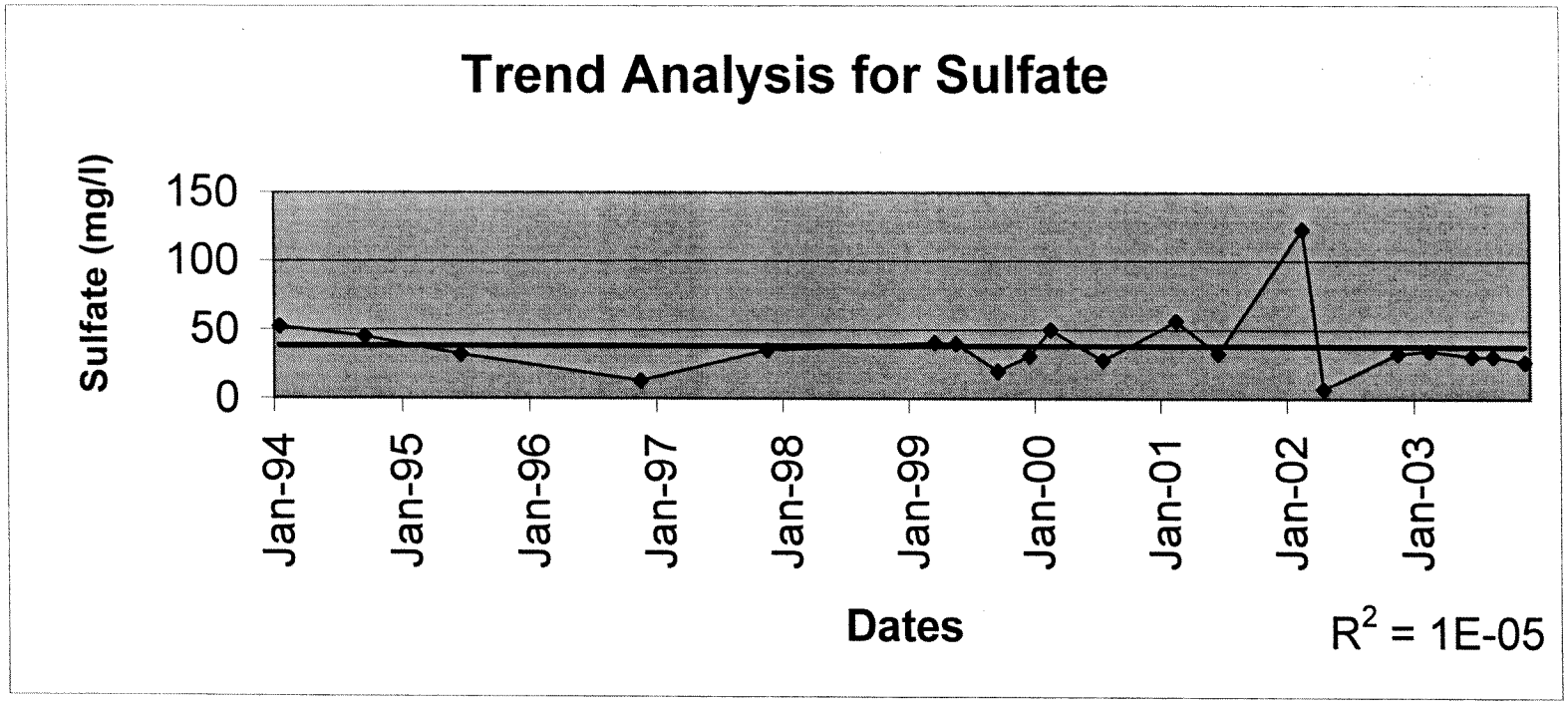
2004 Ground Water Monitoring Evaluation

Doswell WTP Ground Water Monitoring Results

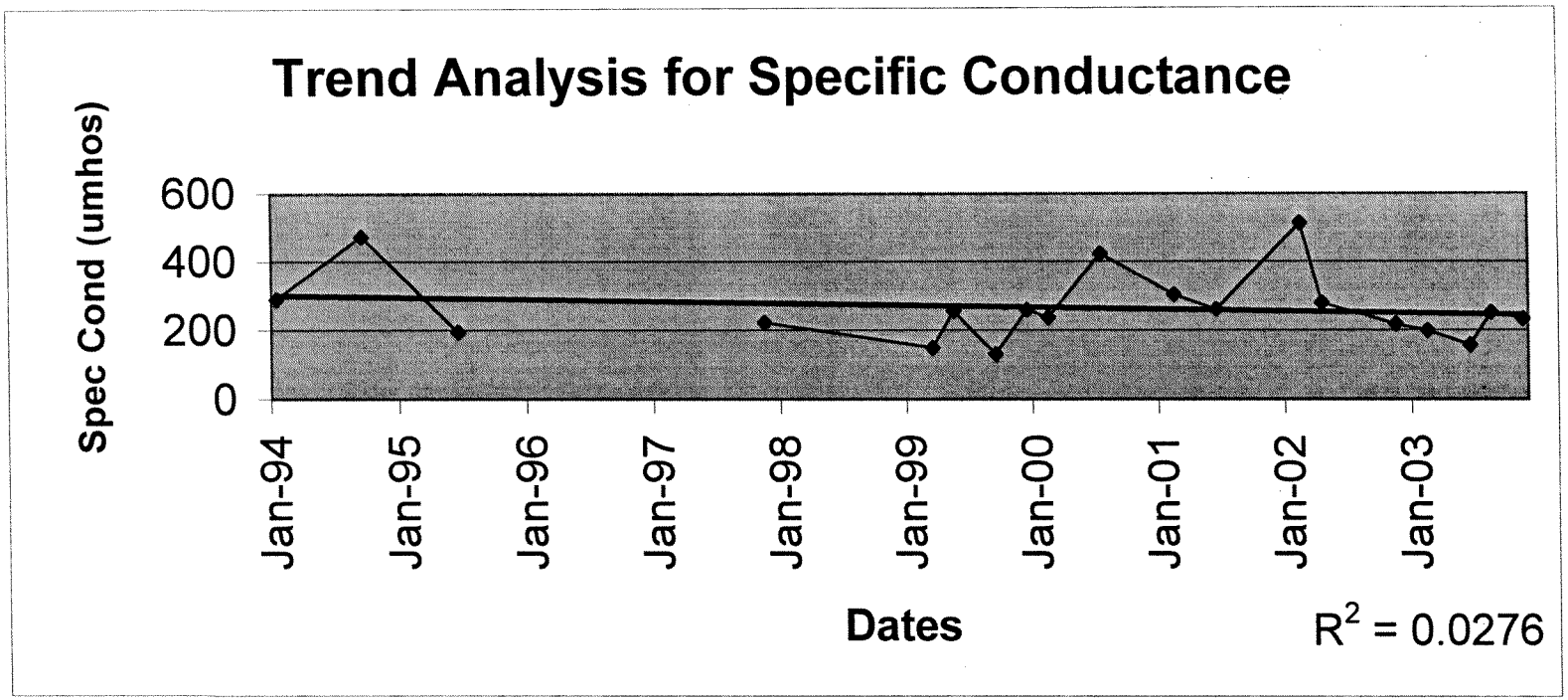
Date	TKN mg/l	Aluminum mg/l	Spec Cond umhos/cm	Sulfates mg/l
Sep-94	2.3	0.019	473	45
Jan-94	1.3	0.311	291	52
Jun-95	0.3	0.5	195	32
Nov-96	0.2	0.13		13
Nov-97	0.3	0.089	223	35
Mar-99	0.3	0.929	150	40.79
May-99	1.9	4.526	256	40
Sep-99	0.3	0.04	131	20
Dec-99	0.5	0	260	31
Feb-00	0.6	0.02	237	50
Jul-00	5	0.564	423	28
Feb-01	0	0.024	304	56
Jun-01	0	0.107	261	33
Feb-02	0.5	19.597	513	123
Apr-02	0.1	0.099	280	7
Nov-02	0.3	0.015	218	33
Feb-03	1.5	1.022	199	35
Jun-03	0.1	0.026	158	31
Aug-03	0.1	0.108	252	31
Nov-03	0.3	0.018	234	27



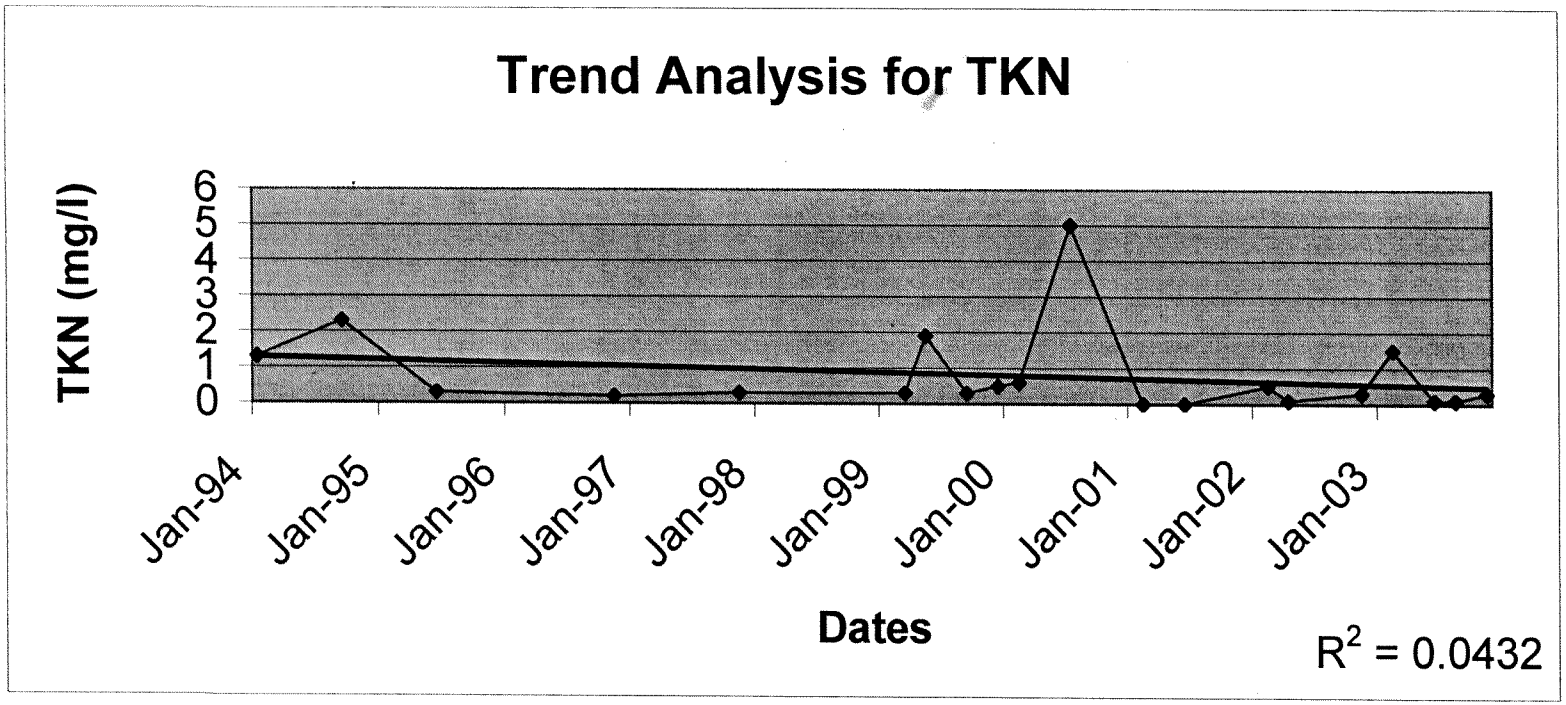
Indicates slight upward trend. However, the R2 value indicates a poor fit thus no conclusion can be drawn.



No specific trend noted. R2 value shows poor fit.



Slight downward trend. However, the R2 value indicates a poor fit thus no conclusion can be drawn.



Slight downward trend. However, the R2 value indicates a poor fit thus no conclusion can be drawn.

Attachment 9

DEQ Correspondence Regarding Whole Effluent Toxicity Testing

VA0025569 K/L-K

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
PIEDMONT REGIONAL OFFICE
4949-A Cox Road, Glen Allen, Virginia 23060
(804) 527-5020 Fax (804) 527-5106
www.deq.virginia.gov

Preston Bryant
Secretary of Natural Resources

David K. Paylor
Director

Gerard Seeley, Jr.
Regional Director

January 23, 2006

Mr. David F. Van Gelder
Chief of Operations and Maintenance
P.O. Box 470
Hanover, VA 23069-0470

RE: Whole Effluent Toxicity (WET) testing requirement for VPDES Permit No. VA0025569 – Doswell Water Treatment Plant.

Dear Mr. Van Gelder:

Review of the four quarterly WET tests, completed between January and October of 2005, indicates that the effluent does not exhibit actual or potential toxicity. As stated in Part I.C.1.c, of the referenced permit, no further WET testing is required during this permit cycle.

If you have any questions, please contact me at cdchamberlain@deq.virginia.gov or at (804) 527-5081.

Sincerely,

Corwin Chamberlain
Environmental Specialist II

Attachment 10

NPDES Permit Rating Work Sheet

NPDES Permit Rating Work Sheet

- ☐ Regular Addition
- ☐ Discretionary Addition
- ☐ Score change, but no status change
- ☐ Deletion

NPDES No.: VA0025569

Facility Name: DOSWELL WATER TREATMENT PLANT

City: HANOVER COUNTY

Receiving Water: NORTH ANNA RIVER

Reach Number:

Is this facility a steam electric power plant (SIC=4911) with one or more of the following characteristics?

1. Power output 500 MW or greater (not using a cooling pond/lake)
2. A nuclear power plant
3. Cooling water discharge greater than 25% of the receiving stream's 7Q10 flow rate

☐ YES; score is 600 (stop here) ☑ NO (continue)

Is this permit for a municipal separate storm sewer serving a population greater than 100,000?

☐ YES; score is 700 (stop here) ☑ NO (continue)

FACTOR 1: Toxic Pollutant Potential

PCS SIC Code: Primary SIC Code: 4941

Other SIC Codes:

Industrial Subcategory Code: 01 (Code 000 if no subcategory)

Determine the Toxicity potential from Appendix A. Be sure to use the TOTAL toxicity potential column and check one)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
☐ No process waste streams	0	0	☐ 3.	3	15	☑ 7.	7	35
☐ 1.	1	5	☐ 4.	4	20	☐ 8.	8	40
☐ 2.	2	10	☐ 5.	5	25	☐ 9.	9	45
			☐ 6.	6	30	☐ 10.	10	50

Code Number Checked: 7

Total Points Factor 1: 35

FACTOR 2: Flow/Stream Flow Volume *(Complete either Section A or Section B; check only one)*

Section A —Wastewater Flow Only Considered

Wastewater Type (See Instructions)			Code	Points
Type I:	Flow < 5 MGD	☐	11	0
	Flow 5 to 10 MGD	☐	12	10
	Flow >10 to 50 MGD	☐	13	20
	Flow > 50 MGD	☐	14	30
Type II:	Flow <1 MGD	☐	21	10
	Flow 1 to 5 MGD	☐	22	20
	Flow >5 to 10 MGD	☐	23	30
	Flow >10 MGD	☐	24	50
Type III:	Flow <1 MGD	☐	31	0
	Flow 1 to 5 MGD	☐	32	10
	Flow >5 to 10 MGD	☐	33	20
	Flow >10 MGD	☐	34	30

Section B —Wastewater and Stream Flow Considered

Wastewater Type (See Instructions)	Percent of Instream Wastewater Concentration at Receiving Stream Low Flow		Code	Points
TYPE I/III:	< 10%	☐	41	0
	≥ 10% to <50%	☐	42	10
	≥ 50%	☐	43	20
Type II:	< 10%	☑	51	0
	≥ 10% to <50%	☐	52	20
	≥ 50%	☐	53	30

$\frac{0.3875}{23} \times 100 = 1.7\%$

23 in 1Q10

Code Checked from Section A or B: 51

Total Points Factor 2: 0

NPDES Permit Rating Work Sheet

FACTOR 3: Conventional Pollutants
(only when limited by the permit)

NPDES No.: VA0025569

A. Oxygen Demanding Pollutant: (check one) ☐ BOD ☐ COD ☐ Other: _____

Permit Limits: (check one)		Code	Points
☐	<100 lbs/day	1	0
☐	100 to 1000 lbs/day	2	5
☐	>1000 to 3000 lbs/day	3	15
☐	>3000 lbs/day	4	20

N/A

Code Checked: |__|

Points Scored: |__|__|

B. Total Suspended Solids (TSS)

Permit Limits: (check one)		Code	Points
☐	<100 lbs/day	1	0
☑	100 to 1000 lbs/day	2	5
☐	>1000 to 5000 lbs/day	3	15
☐	>5000 lbs/day	4	20

Code Checked: |2|

Points Scored: |__|5|

C. Nitrogen Pollutant: (check one) ☐ Ammonia ☐ Other: _____

Permit Limits: (check one)		Nitrogen Equivalent	Code	Points
☐	<300 lbs/day		1	0
☐	300 to 1000 lbs/day		2	5
☐	>1000 to 3000 lbs/day		3	15
☐	>3000 lbs/day		4	20

N/A

Code Checked: |__|

Points Scored: |__|__|

Total Points Factor 3: |__|5|

FACTOR 4: Public Health Impact
Is there a public drinking water supply located within 50 miles downstream of the effluent discharge (this includes any body of water to which the receiving water is a tributary)? A public drinking water supply may include infiltration galleries, or other methods of conveyance that ultimately get water from the above referenced supply.

☐ YES (If yes, check toxicity potential number below)

☑ NO (If no, go to Factor 5)

Determine the *human health* toxicity potential from Appendix A. Use the same SIC code and subcategory reference as in Factor 1. (Be sure to use the human health toxicity group column — check one below)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
☐ No process waste streams	0	0	☐ 3.	3	0	☐ 7.	7	15
☐ 1.	1	0	☐ 4.	4	0	☐ 8.	8	20
☐ 2.	2	0	☐ 5.	5	5	☐ 9.	9	25
			☐ 6.	6	10	☐ 10.	10	30

Code Number Checked: |__|__|

Total Points Factor 4: |__|__|

NPDES Permit Rating Work Sheet

FACTOR 5: Water Quality Factors

NPDES No.: |V|A|0|0|2|5|5|6|9|

A. *Is (or will) one or more of the effluent discharge limits based on water quality factors of the receiving stream (rather than technology-based federal effluent guidelines, or technology-based state effluent guidelines), or has a wasteload allocation been assigned to the discharge?*

	Code	Points
☑ Yes	1	10
☐ No	2	0

B. *Is the receiving water in compliance with applicable water quality standards for pollutants that are water quality limited in the permit?*

	Code	Points
☑ Yes	1	0
☐ No	2	5

C. *Does the effluent discharged from this facility exhibit the reasonable potential to violate water quality standards due to whole effluent toxicity?*

	Code	Points
☐ Yes	1	10
☑ No	2	0

Code Number Checked: A|1| B|1| C|2|

Points Factor 5: A|1|0| + B|0| + C|0| = |1|0| TOTAL

FACTOR 6: Proximity to Near Coastal Waters

A. *Base Score: Enter flow code here (from Factor 2):* |5|1| *Enter the multiplication factor that corresponds to the flow code:* |.|1|

Check appropriate facility HPRI Code (from PCS):

	HPRI #	*Code*	*HPRI Score*
☐	1	1	20
☐	2	2	0
☐	3	3	30
☑	4	4	0
☐	5	5	20

HPRI code checked: |4|

Flow Code	Multiplication Factor
11, 31, or 41	0.00
12, 32, or 42	0.05
13, 33, or 43	0.10
14 or 34	0.15
21 or 51	0.10
22 or 52	0.30
23 or 53	0.60
24	1.00

Base Score: (HPRI Score) 0 x (Multiplication Factor) 0.1 = 0 (TOTAL POINTS)

B. *Additional Points — NEP Program*
For a facility that has an HPRI code of 3, does the facility discharge to one of the estuaries enrolled in the National Estuary Protection (NEP) program (see instructions) or the Chesapeake Bay?

	Code	Points
☐ Yes	1	10
☐ No	2	0

N/A

C. *Additional Points — Great Lakes Area of Concern*
For a facility that has an HPRI code of 5, does the facility discharge any of the pollutants of concern into one of the Great Lakes' 31 areas of concern (see instructions)

	Code	Points
☐ Yes	1	10
☐ No	2	0

N/A

Code Number Checked: A|4| B|__| C|__|

Points Factor 6: A|__|0| + B|__|__| + C|__|__| = |0| TOTAL

NPDES Permit Rating Work Sheet

SCORE SUMMARY

NPDES No.: VA0025569

Factor	Description	Total Points
1	Toxic Pollutant Potential	35
2	Flow/Streamflow Volume	0
3	Conventional Pollutants	5
4	Public Health Impacts	0
5	Water Quality Factors	10
6	Proximity to Near Coastal Waters	0
	TOTAL (Factors 1 through 6)	50

S1. Is the total score equal to or greater than 80? ☐ Yes (Facility is a major) ☑ No

S2. If the answer to the above question is no, would you like this facility to be discretionary major?

☑ No

☐ Yes (Add 500 points to the above score and provide reason below:

Reason: _____

NEW SCORE: 50

OLD SCORE: 55

RAY JENKINS
Permit Reviewer's Name

(804) 527-5037
Phone Number

SEPTEMBER 11, 2009
Date